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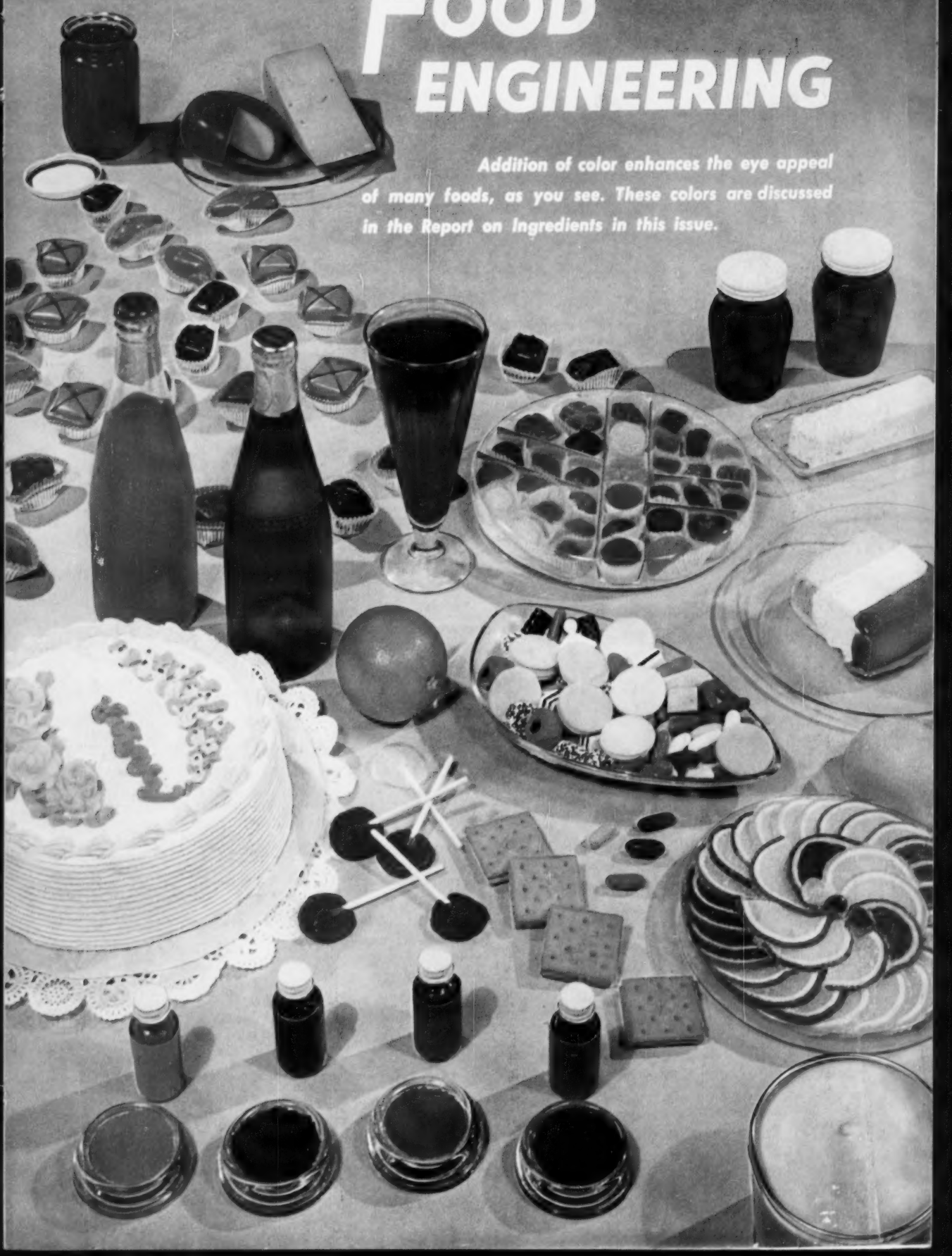
FOOD ENGINEERING

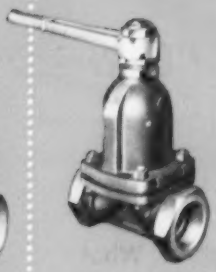


Addition of color enhances the eye appeal of many foods, as you see. These colors are discussed in the Report on Ingredients in this issue.

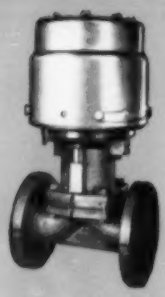
ALL-PURPOSE VALVE

for handling materials as diversified as corrosive fluids, gases, beverages, viscous materials, foods, compressed air, solids in suspension.

Handwheel Operated



Lever Operated



Power Operated

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Unsurpassed on lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are costly factors.

In industries as varied as mining, food, textile, pulp and paper, beverage, water and sewage, chemicals . . . Grinnell-Saunders Diaphragm Valves continue to win enthusiastic acceptance. The unique design of the valve — with its flexible, long-wearing, tight-closing diaphragm — offers many unusual advantages.

If you have a valve problem, it will pay you to write Grinnell for further information.

Choice of Materials

Bodies — iron; cast steel; stainless steel; Durimet 20; Hastelloy A, B, C; bronze; Monel; aluminum; PVC (polyvinyl chloride); Saran

Body linings — hard rubber; soft rubber; neoprene; glass; lead; plastics; Heresite; Lithcote

Diaphragms — soft natural rubber; natural rubber; white synthetic rubber; neoprene; reinforced neoprene; butyl; Hycar; Teflon; Kel-F; PVC (polyvinyl chloride); polyethylene

Bonnets — iron; stainless steel; bronze; other materials on special order

Choice of Bodies

Conventional weir type

Straight bodies — screwed; flanged; socket weld; butt weld; socket (solder); sanitary threads; hose ends; Victaulic

Angle bodies — screwed; flanged; socket weld

Other types

A line of Straightway Valves (for straight-thru flow) and Full-Bore Valves (for ball brush cleaning) also are available

Choice of Bonnets

Handwheel (non-indicating stem, indicating stem); chain wheel; lever (for quick operation); sliding stem (for a wide selection of power operated topworks)

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- diaphragm lifts high for streamline flow in either direction
- diaphragm presses tight for positive closure
- simple maintenance — diaphragm easily replaced without removing valve body from line

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industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

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How progressive bakery operators boost efficiency with large aluminum containers.

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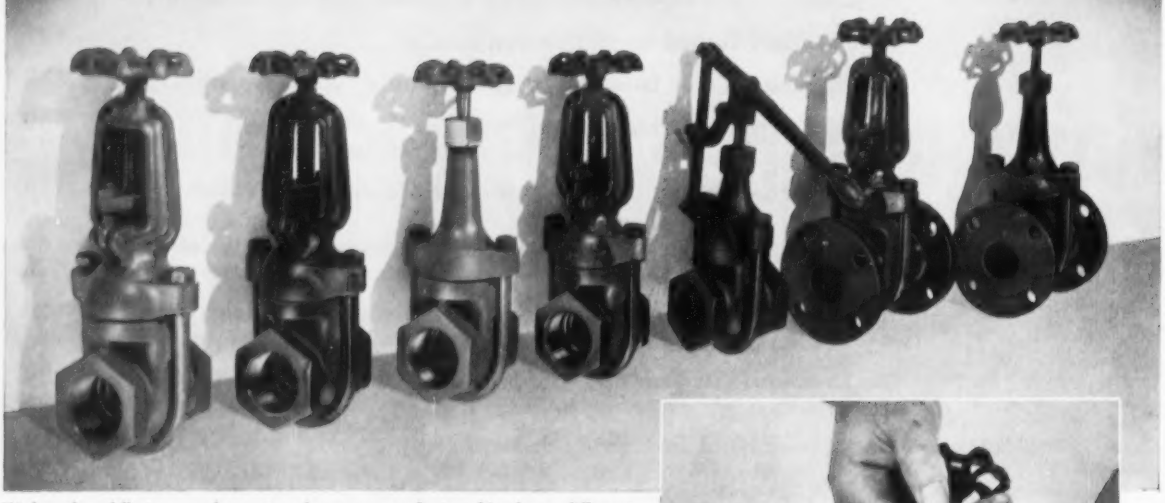
Eleven lines of WALWORTH Saddle Type Wedge Gate Valves

Bronze-Mounted — All-Iron — Ni-Resist

Outside Screw and Yoke — Non-Rising Stem — Quick Opening

Flanged Ends — Screwed Ends



Walworth saddle-type wedge gate valves are manufactured in eleven different combinations of designs and materials, seven of which are illustrated above.

Saddle type wedge gate valves are easy to take apart and are particularly suitable for lines requiring frequent cleaning. Walworth Saddle-Type Wedge Gate Valves are available in a variety of designs including OS & Y; Inside Screw Rising Stem, and Sliding Stem Quick Opening types—in Bronze-Mounted, All-Iron, and Ni-Resist. All types are designed to permit repacking under pressure in either the open or closed position.

FOR COMPLETE INFORMATION, See your local Walworth Distributor or write on business stationery for illustrated circular.

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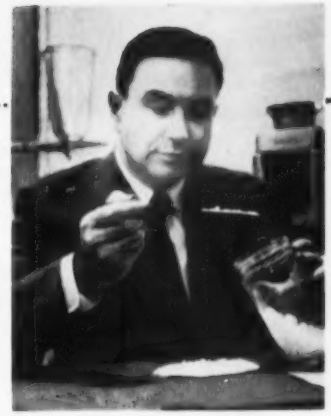

Meet Leonard Trauberman

You see him in an ingredient laboratory—his interest focused on a new additive that lengthens shelf-life.

Len specializes on ingredients in his work as Assistant Editor of Food Engineering. He keeps readers updated on this all-important, fast-moving phase of the industry.

You'll see what we mean when you turn to the Ingredients Report on page 113 of this issue. That "must reading" article on new ingredients is but a part of the 18-page report which he put together.

And well-equipped is he for this assignment. He cut his food-career teeth on raw materials in 1947—after being graduated as a chemical engineer. Right off, he had to handle a sticky problem—how to prevent chewing gum from developing a taste like turpentine. He licked it with an antioxidant, NDGA. Seems that oxidation of terpenes was the culprit.

Len can also tell you from experience how to upgrade blackstrap to a light-colored, mild-flavored syrup—how to take prussic acid out of apricot kernels—or how to remove the "sterility factor" from certain resins. But more to the point, he has first-hand technical knowledge of a wide range of food ingredients and products—not only in respect to quality control, but production, too.

Len spent 5 years in plants producing chewing gum, bakery supplies, syrups and condiments. And during this time he obtained his Masters, with a minor in food technology.

Before joining FE in 1954, Mr. Trauberman also served with U. S. Naval Research. Here his activities involved laboratory tests and plant visits encompassing many foods.

What with his engineering training and production experience, Len's knowledge goes far beyond ingredients and quality control. That's why he does such an expert job of handling FE's top-ranking equipment department—and why he tells readers just what they want to know in his feature articles on advanced food plant engineering.

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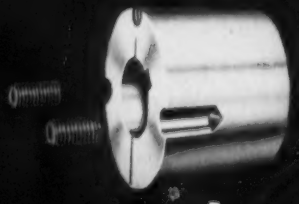
—IT'S INTERCHANGEABLE!



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Taper-Lock bushings are available in a range of sizes which makes it easy to change from one size shaft to another. Taper-Lock products slip onto the shaft quickly — hold with the firmness of a shrunk-on fit—come off easily, without shock to bearings or machinery. You'll profit by standardizing on Taper-Lock.

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TRENDS & FORECASTS

Special

FOOD ENGINEERING

Service to Executives

There now are 170 million food consumers in the United States. And every 12 seconds sees a net gain of one consumer. With the population increasing at an annual rate of about 1.8%, the number of mouths to feed will jump about 3 million in the next 12 months.

Population in 1975 is forecast at 210 to 220 millions. And economists estimate that by that time the size of the nation's economy will be almost double, with disposable real income per capita half again as large as at present.

Processed fruits and vegetables have far outstripped the fresh in gains in the past 20 years. This indicates that the country will have become a nation of processed food consumers by 1975.

A record-breaking 681 million cases of canned foods, or 22¼ billion cans and jars, were produced last year, preliminary figures indicate. Dollar-wise, the volume amounts to about $4¼ billion. Fifty years ago the output was a mere 40 million cases.

Yet the number of canning firms declined from 2,265 to 1,758 between 1947 and 1954, the census of manufactures reveals. This shows how rapidly food is becoming an industry of large-scale manufacturing operations.

Per capita consumption of all fruits and fruit juices may increase by one-fifth by 1975, and that of all vegetables by one-sixth, in the opinion of Assistant Secretary of Agriculture Earl L. Butz. Further dietary shifts from fats, cereals, and potatoes to fruits and vegetables are foreseen.

Container Prices Rise

Metal and glass food container prices rose more steeply in 1956 than in the year previous, the Bureau of Labor Statistics reports. Measured by the BLS wholesale price index, manufacturers were getting about 8% more for their products in December and January.

The price of paperboard also moved up over the year, but by a lesser amount.

Wholesale prices of metal containers moved from 137.9% of the 1947-49 average in January, 1956, to 147.5% in December. They held at the latter level during January, 1957. The rise was somewhat steeper than that recorded in 1955, which began with the index at 131.6 and averaged 132.9 for the year.

Glass containers showed a similar pattern. The wholesale index (1947-49 equals 100) reached 157.9 in December, 1956, and remained there in January. A year earlier, the index was 147.9—up 5.3 points from January, 1955. The 1955 average was 142.9.

Paperboard container makers were paying 36.2% more for their principal raw material in January, 1957, than in the 1947-49 period. The wholesale price index for paperboard had moved from 130.7 in January, 1956, to 136.2 in December, and was still at the latter figure as the new year got underway. The 1955 annual average index for paperboard was 127.1% of the 1947-49 level.

Food Plant Wages Climb

Average hourly earnings of food plant workers reached a new peak in January. Barring any serious dip in economic conditions generally, they

HAMILTON
STAINLESS STEEL KETTLES

JUST think! Over three quarters of a century building fine cooking and mixing kettles for industry. These quality units, engineered and designed by the finest craftsmen, insure higher efficiency, labor-saving and cost-saving operation. There's no substitute for the best—"Hamilton." When it comes to mixing, the agitators, the drives are designed for longer life and these rugged sanitary units have proved themselves in operation. The Steam-Jacketed Kettles are fast-cooking, easy-cleaning, precision-built.

If it's the best you want—then you want "Hamilton," the foremost designers and producers of the finest kettles to mix and cook. There's a "Hamilton" to suit your specifications so why settle for anything but the best, a "Hamilton" Stainless Steel Kettle.

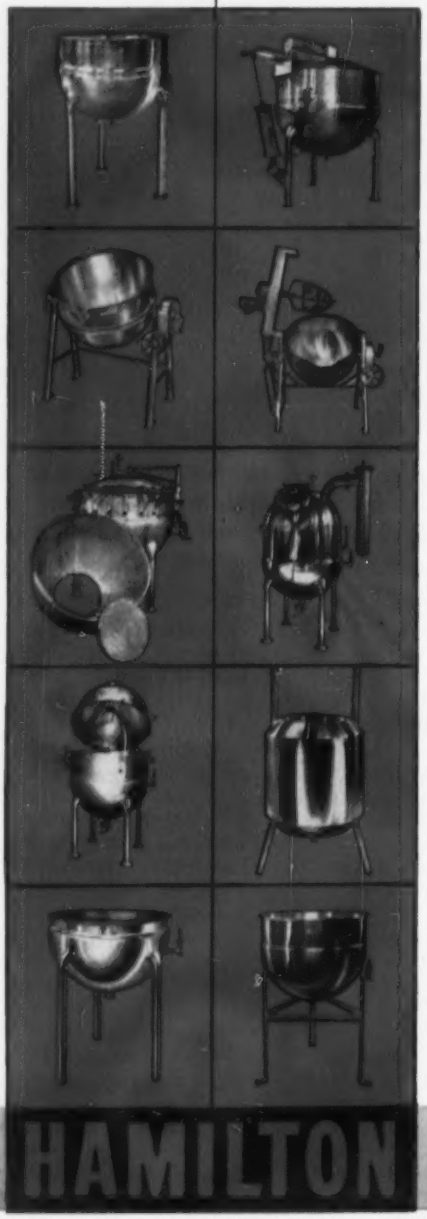
STYLE SA
Streamlined design, balloon gasket. Extra large diameter provides greater heating surface, efficient cooking. Sizes range from 15 to 500 gallon. A.S.M.E. Code constructed for steam working pressures of 40, 90 and 125 pounds.

STYLE CW
Designed to process large batches up to 150 gallons. Positive worm gear and handwheel give complete control of large capacity loads while tilting. Large diameter kettle gives fast, even cooking. Sizes from 30 to 150 gallons.

STYLE PC
Stainless steel pressure cooking kettle, designed especially for meat and poultry processing. Balloon jacket gives increased heating capacity. Built for 90 p.s.i. in jacket and 15 p.s.i. in kettle. Has quick opening latches. Top is lifted by eccentric lever. Sizes 30 to 250 gallons.

STYLE VT
For small batches this unit has no equal. Vacuum cooker with tilting top, easy loading. Sizes from 30 to 150 gallons. Sanitary design throughout. Jacketed for 90 p.s.i. steam working pressure.

STYLE SB
Shallow type kettle with balloon jacket. Streamlined for complete sanitation. A.S.M.E. Code constructed for working pressures of 40, 90, and 125 pounds. Sizes range from 15 to 350 gallons. Larger size kettle can be furnished to meet specifications.



STYLE SA MIX COOKER
Standard SA Mix Cooker has either single motion or double motion agitator with or without hydraulic lift. With hydraulic lift agitator lifts easily and smoothly out of cooker. Sizes range from 30 to 500 gallons.

STYLE CW MIX COOKER
Large diameter gives fast even cooking. Hydraulic Lift tilts agitator smoothly and easily out of tilting kettle. Available for 40, 90, 120 pounds steam working pressure.

STYLE HV
A vacuum cooker for large capacities from 150 to 500 gallons. A hinged manhole is provided for access to the inside. Available with a mixer — circulator can be installed to increase heat transfer and agitation.

CIRCULATOR
Stainless steel steam immersion heating unit can be installed in any kettle regardless of size or shape. Gives extra heating surface at the center of kettle. Creates thermal agitation. Speeds up cooking 45%.

STYLE A
General purpose steam jacketed kettle used in processing food, drugs, and chemicals. Full ½ jacketed. Sizes range from 15 to 500 gallons. Also available in Type 316 stainless steel or nickel. Larger sizes to meet specifications.

KETTLE SPECIALISTS HAMILTON SINCE 1876

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Trends & Forecasts

will continue to inch upward as the year progresses.

Latest available data from the Bureau of Labor Statistics puts average hourly earnings in January at $1.94 for the industry's 1,490,000 employes engaged in production.

That figure is 9¢ ahead of the average hourly rate for 1956 and marks an advance of 61¢ from 1950.

Hourly earnings vary widely among branches of the industry.

Meat packing led the parade for the first time in January, paying an average hourly wage of $2.22. Previous leader, beverage bottling, checked in with a January pay rate of $2.16.

For 1956 as a whole, meat plants paid $2.10 an hour, while beverage workers averaged $2.13. In 1950, Beverage wages led at $1.52, and meat products trailed at $1.44. At the bottom of the list in each period was the confectionery and related products branch—$1.57 in January, $1.54 in 1956, and $1.17 in 1950.

Other major branches registered January pay rates as follows: Sugar processing, $2.00; grain mill products, $1.92; bakery products and "miscellaneous" food group, each $1.84; dairy products, $1.81; and canning and preserving, $1.65.

Food processing has moved from near the bottom to near the top of the non-durables goods industries insofar as wage scales are concerned. In 1950, hourly earnings in soft goods field averaged 1.38. Food processors, who are included in this broad group, paid $1.33.

But last year food processors paid an average $1.85 an hour, or 4¢ more than the non-durable manufacturing industry group.

At the start of 1957, the spread became even wider—$1.94 for food processing, $1.86 for soft goods producers.

At the same time, average hourly earnings in the food industry moved closer to the average for all-manufacturing industries, which stood at $2.05 in January 1957, averaged $1.98 in 1956, and $1.47 in 1950.

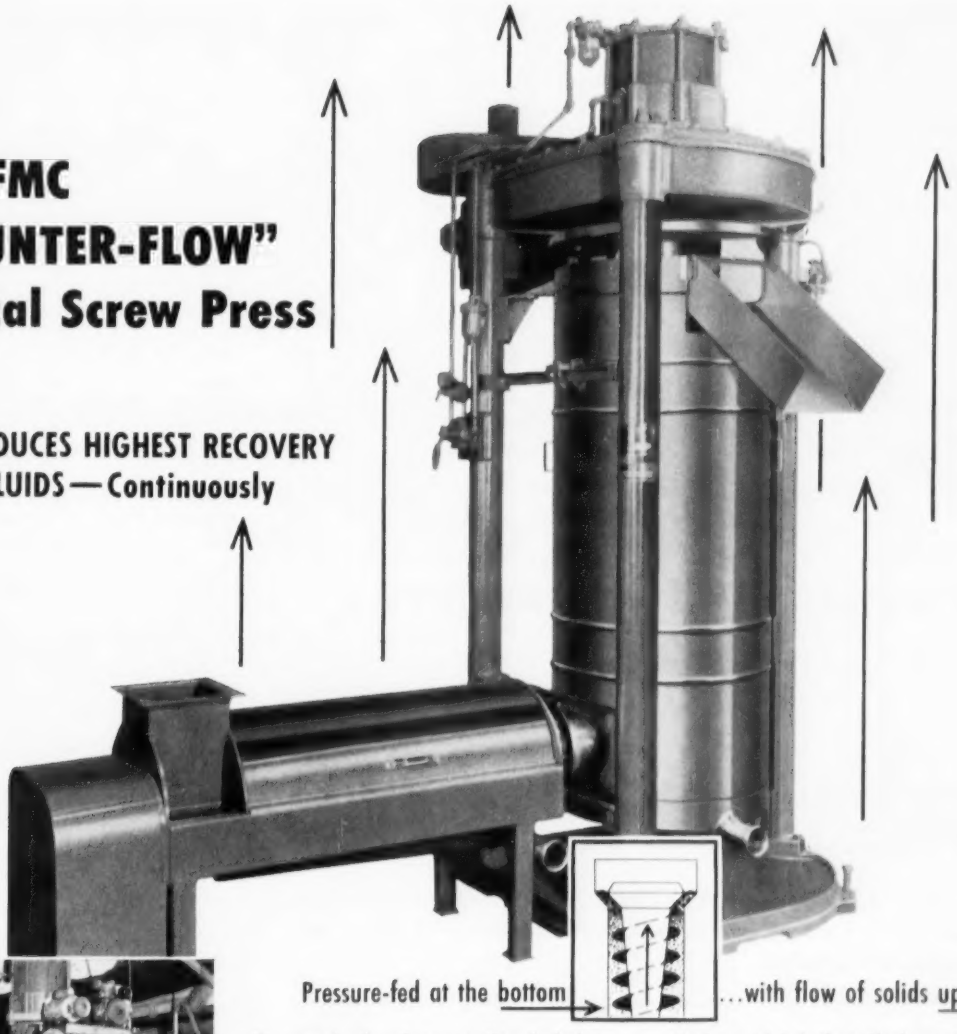
Rush to Robot Vending

Packing of canned and frozen foods for hot-vending from coin machines is getting intensified attention. Latest development that may influence this trend is the "Kwik Cafeteria"—a battery of machines that will serve a complete meal of hot frozen foods.

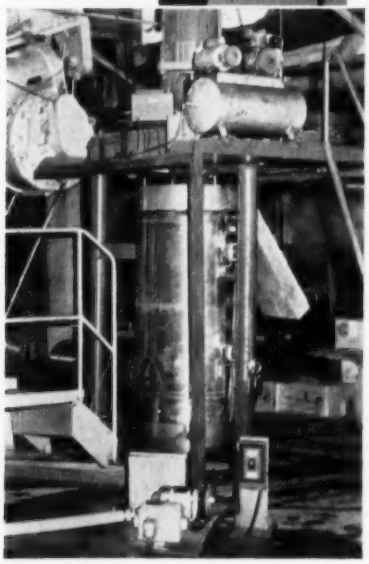
Introduced by Rudd-Melikian, Inc.,

New FMC "COUNTER-FLOW" Vertical Screw Press

PRODUCES HIGHEST RECOVERY OF FLUIDS — Continuously



Pressure-fed at the bottom **...with flow of solids upward**



View of prototype FMC Vertical Screw Press installed at Bercut-Richards Packing Co., Sacramento. Tested and used in actual production runs during the 1955 tomato season, the additional juice recovery and reduced cost of wet waste disposal saved cost of equipment in about half a season.

By standards of conventional design, the new FMC Vertical Screw Press is "upside down," contrary indeed to long established concepts of flow-direction and gravity as they affect fluid recovery and de-watering operations.

And revolutionary it is, introducing the exclusive FMC "Counter-flow" principle, proved conclusively for greatly increased efficiency, capacity and recovery of fluids.

Here's how it works: the solids to be processed (such as tomato, carrot, pineapple, prune, citrus, etc.) are screw-fed into machine at the *bottom*. The inverted screw cone conveys it upward, forming a press cake at the *top* of the cylinder, which is then discharged. Advantages? Press cake is easily formed as the machine starts up; press cake "channeling" is eliminated, preventing loss of unpressed material; flow of fluid is downward, doesn't re-wet the dry pomace.

Featuring the exclusive FMC "Flo-Mor" backing screen, the FMC Press provides up to 60% additional effective draining area per square foot of screen surface, resulting in even greater machine capacity. It's constructed for easy cleaning, too. Even the center spindle, components of which are held by quick-opening clamps and hinges, are readily accessible.

Write for full information, or call your nearest FMC representative.

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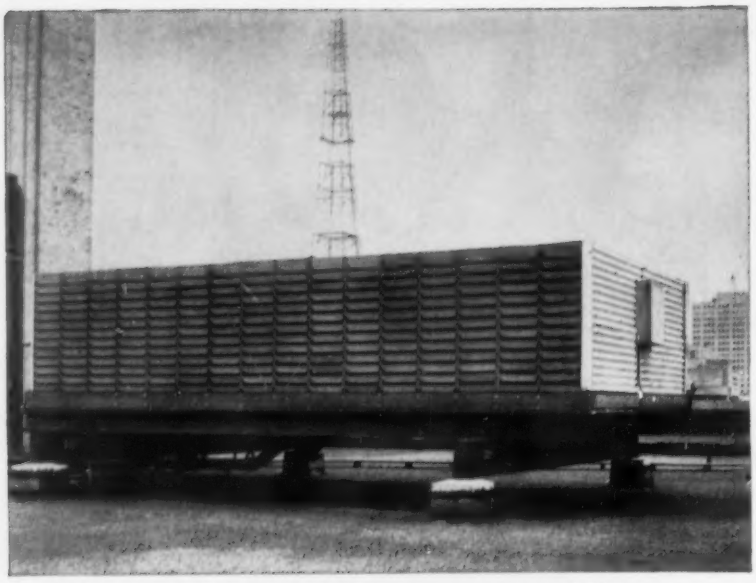

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Marley Double-Flow Aquatowers are the cooling towers selected for the overwhelming majority of modern buildings that require air conditioning and refrigeration services on an institutional or commercial scale. Engineers evaluate cooling performance, initial cost, power cost, anticipated service life and maintenance cost. It adds up to cost per gallon of cold water, and in every instanee Double-Flow Aquatowers are favored as the logical investment in water cooling equipment.

If you haven't noticed them on hundreds of modern buildings, that's understandable — for the Double-Flow Aquatower is the original low-silhouette cooling tower that blends inconspicuously with all types of modern architecture. But if you have had an opportunity to inspect one in service, you'll agree that it is obviously designed for years of consistent performance, and that operation and maintenance are so simplified that they require no special technical ability.

Double-Flow Aquatower advantages are spelled out in more detail in our Bulletin DFAQ, and a copy is yours for the asking.

*Reg. Trademark

MARLEY

The Marley Company

Kansas City, Missouri

Trends & Forecasts

Hatboro, Pa., the vendor is aimed at in-plant feeding. And it comes at a time when packers are taking a good look at machine vending to increase the number of outlets for frozen foods.

Some see these outlets as an answer to the shortage of retail cabinets. Others think vendors could tap a new frozen food market, especially for precooked products.

More canned foods are going into heat-and-eat vending machines this year. Campbell and Heinz are competing strongly for the business. Armour is into it with soups. American Home Foods, Stokely-Van Camp, and a number of smaller firms are aboard the bandwagon.

Single-portion cans are primarily involved in this business. But a new boost may come from experimental casserole or dish selections in aluminum foil trays.

Record Set by Margarine

Margarine sales this year should match or slightly exceed the 1,369 million pound record sales volume achieved in 1956. That's the cautious appraisal of National Assn. or Margarine Manufacturers. Unofficial forecasts by some trade experts put the 1957 sales total of between 1,375 million and 1,380 million pounds.

"We could make a more confident forecast," says one trade expert, "if we knew what this year's surplus butter program will look like."

Last year, government surplus disposal sales of butter to the school lunch program, state and other welfare institutions, the Army, and Veterans' Administration cut into margarine's potential market. And dairy state legislators now are seeking an expansion of these programs, which took well over $100 million worth of surplus butter from government-acquired stocks.

Takes Strawberry Lead

California strawberry freezers received over 144 million lb. of raw berries last (1956) season. When processed with sugar-added, this will amount to around 170 million lb. This compares to the reported 1956 pack of Oregon, Washington, Idaho, and Utah of over 79 million lb.

The Northwest's pack, in years past, topped any other region's production. But, California's production now leads the nation.

Evidently California intends to try

← For more data, circle this page number on card at back

NEW RELIANCE V★S Jr.

Get fast speed changes over a 30 to 1 range with this all-electric variable speed drive.

The new V★S Jr. gives you instantaneous speed changes, even under load, without belts, pulleys, or gears. This Reliance Drive puts the complete machine operation at the operator's fingertips. All functions, jog, start, stop, reverse and speed changes, are placed in a compact, remote control station.

There's a big power cushion in the motor, too . . . power for smooth speed pick up, even under heavy shock loads, and dynamic braking for fast controlled stops without shuddering or jerking.

The Reliance V★S Jr. is your answer to machinery drive problems in the ¾ to 4 horsepower range. Package construction makes installation easy; just plug it in to a single phase 220 or 440 volt a-c. line.

Write for complete details and prices. (D-1639)

RELIANCE ELECTRIC
AND ENGINEERING COMPANY

DEPT. 374A, CLEVELAND 17, OHIO • CANADIAN DIVISION: WELLAND, ONTARIO
Sales Offices and Distributors in Principal Cities

For more data, circle this page number on card at back →

How stainless helps control quality and lower costs in food processing

In the soft drink industry, profits are figured in pennies per case and fractions of a cent per bottle. To make a profit, the labor cost, purity and flavor of the drink, come in for constant scrutiny. Stainless steels in the bottling plant have proved the answer to many of the bottler's problems of keeping costs down and quality up.

This 1400 gallon stainless steel syrup storage tank is a good example of where stainless does the best job. It's destined for the new plant of the Pepsi-Cola Bottling Company of Atlanta. It was fabricated by Potter & Rayfield, Inc., Atlanta, Ga.

Considered from a practical, dollars and cents standpoint, stainless steel is the best choice wherever food products touch metal. For example . . .

Stainless can be cleaned completely in record time—a saving in labor costs and an assurance that all contaminants have been completely removed.

Stainless resists the attack of acids and other corroding factors encountered in food processing—a long range saving of equipment and maintenance.

Stainless steel leaves foods strictly alone—it eliminates the chance of metal ion contamination. You save through fewer rejects.

Stainless steel resists abrasion—units last longer, even when subject to constant wear.

There's a lot more to the stainless story. Much of it is contained in Crucible's 40-page booklet "Making the Most of Stainless Steels in the Food Processing Industry." Write for your free copy today. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor—Railway & Power Engineering Corp., Ltd.

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to hold this dominant position. The state's Strawberry Council has voted an increase (to $64,000) in its 1957 advertising and public relations budget. And, with an eye to quality improvement and increased yields, a number of new strawberry varieties are being test-grown in various areas in the state.

HORS D'OEUVRES

▶ Writing about the Utopia that cometh, a syndicated scribe says that the suburban home in 1976 will be a miniature chemical vegetable farm. Silly boy. We'll all be so lazy with leisure in '76 that we'll have to be pushbutton fed.

▶ Tait's Super Valu market in Minneapolis has equipped shopping carts with radios. Shades of Marconi! Do the ladies have to listen to detergent operas even at the soap counter?

▶ A food company employs a ball player, and a ball club hires a clown. American enterprise requires unusual talent these days.

▶ Humor, says Rev. Laurence H. Hall, is a business asset and America's secret weapon. Maybe, but be certain it isn't loaded.

▶ They say that the package should fit the personality of the product. We suppose this means that cereals puffed by being "shot from guns" ought to be packaged in shot-gun shells.

▶ People are spending more time at home with TV, they are drinking more of their beer in their own living rooms, and the divorce rate is declining. Any relationship between these trends is purely coincidental.

▶ A can opener invented 67 years ago looked much like a semi-circular hatchet. There are times when we wish it were still around.

Oakite

HURRICLEAN

Gun

new steam-detergent gun packs a cleaning wallop

—yet it weighs in at only 6¼ lbs.

Shop-talk is growing about the "Hurriclean" Gun. Here is a steam-detergent gun any child could handle, it's that light, that safe—but see what it does! Hitch it to your steam supply, aim it at your toughest cleaning job. Watch it slam into heavy soils, grease, grime. It's almost like "wishing" the dirt away.

Steam-gunning with a hot detergent solution isn't new. What's new is a steam gun that is not heavy, not dangerously hot, not cumbersome. All these disadvantages are completely eliminated in the new Oakite "Hurriclean" Gun.

Light . . . Here is a gun that weighs six and a quarter pounds . . . and does heavyweight cleaning.

Safe . . . Here is a gun that's cool to the touch, hour after hour. The inner tube carries steam, the outer tube carries the cool detergent solution. There are no dangerous hot spots.

Easy . . . Here is a gun that rotates its spray a full 360° by a twist of the rubber grip. You don't swing the gun around, you don't kink hose, you don't even change stance. Cleaning "from under" is a cinch.

Find out how the "Hurriclean" gun can save you money by speeding up sanitation of your processing and handling equipment . . . and also cut costs on maintenance cleaning of floors, walls, equipment . . . and on special jobs like paint-stripping. Call your local Oakite representative, or write for booklet F9737 to Oakite Products, Inc., 27A Rector Street, New York 6, N. Y.

Technical Service Representatives in Principal Cities of U. S. and Canada

OAKITE

Export Division
Cable Address: Oakite

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Ribfoil®

CUPS

● Ribfoil Aluminum Cups, designed by G. L. Canfield, of Basca Manufacturing Company, declared the winner of "The PDC Aluminum Award" in the PACKAGE DESIGNERS COUNCIL'S PACKAGE DESIGN AWARDS COMPETITION.

Ribfoil Aluminum cups are the *newest* development in aluminum packaging . . . judged best in the PDC competition on four points: design, construction, merchandising effectiveness and consumer appeal. This sweepstakes winner has been a proven success since its introduction. At the retail level they have generated a sales success story that is phenomenal.

Ribfoil Aluminum cups are available in a rainbow array of glittering metallic colors. There's one to fit your product. Ribfoil cups can be made in the size you need; stock sizes are 4, 8, 12 and 16 oz.

Ribfoil Aluminum cups can be filled and capped on fully automatic high speed production machinery; or by semi-automatic, or hand filling and capping equipment. Your present machinery is probably adaptable to Ribfoil cups. Multi-color aluminum foil cover caps are available. Hermetic sealing and protective interior coating are optional features.

You'll sell more with RIBFOIL . . . write, wire or call today for full information.

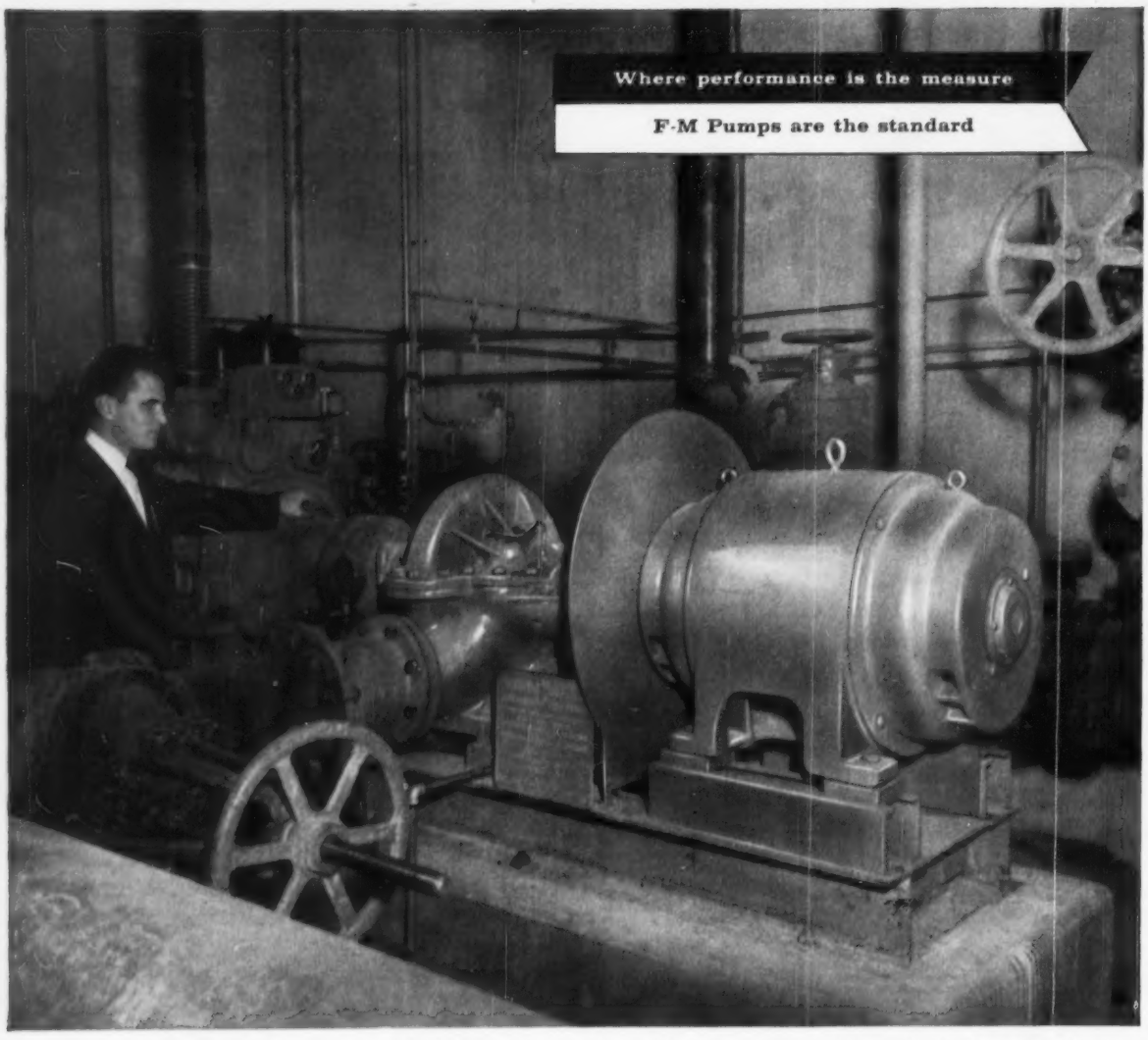
Basca Manufacturing Company

Pioneers in Aluminum Packaging

2222 North Olney Street, Indianapolis 18, Indiana

In Canada: *Cochrane Foilwares, Ltd., Rexdale, Ontario, Canada*

Ribfoil ...THE NEWEST DEVELOPMENT IN ALUMINUM FOIL PACKAGING



Fairbanks-Morse 6" dual-driven fire pump in jet engine testing laboratory.

Standby against 3500 degrees!

Full power testing of Navy jet engines creates exhaust heat up to 3500° F. a few feet from highly inflammable fuel—a constant fire hazard when in the confines of the testing laboratory.

To insure positive protection against fire losses, Thompson Products Gas Turbine Laboratory, Perry, Ohio, has installed a sprinkling system with a Fairbanks-Morse 6" dual-driven fire pump—capable of pumping 1500 gallons per minute. The installation is so dependable, so positive that prompt approval was given by the authorities having jurisdiction.

Don't gamble with the heart of your fire-prevention equipment; insist on F-M pumps with F-M power. See your F-M Field Engineer for expert assistance, or write Fairbanks, Morse & Co., Department FE-4, 600 South Michigan Avenue, Chicago 5, Illinois.

FAIRBANKS-MORSE
a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

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DEVELOPMENTS TO WATCH

Special

FOOD ENGINEERING

Service to Executives

With a magnetic-drum data-processing machine, California Packing Corp. will handle sales statistics, accounts receivable, raw products accounting, inventory control, and order allocation. The computer provides up-to-the-minute picture of diversified operations for management control.

Atomic radiation now can be bought by the hour at RAI Industrial Radia-Center. Rate for exposure to 1,350 curie cobalt-60 source is $8 per hour during day, $2 at night, and $64 for continuous 24-hour use.

Oxygen can be absorbed by enzymatic action inside a food container that is hermetically sealed. In an experimental deoxygenation packet, glucose oxidase causes glucose to take up oxygen and convert to gluconic acid.

Density of apple sauce is controlled automatically with the Plastometer. Continuous sample is passed through flow-bridge piping, developing differential pressure proportional to percent insoluble solids.

Electronic sorting may take over another food inspection task considered difficult to automate. Cling peach halves retaining whole pits or fragments are rejected by a photoelectric scanner.

Steps in complex food plant operations are actuated at proper times by fast, long-life electronic sequence controller with no moving parts. Electronic memory units and magnetic amplifiers do the trick.

Wider use of steel drums for foods may come from new drum-lining process. A uniform, impervious inner coating of plastic is centrifugally atomized onto metal, then lining is oven-cured.

Polyethylene-lined ship's holds have carried first bulk shipment of raw sugar from Philippines to the United States. This experiment portends significant cost savings.

Fresh fish dipped in 10-ppm. solution of aureomycin chlortetracycline arrived in Vancouver in excellent condition after 5 days under ice refrigeration enroute from Halifax. This was the first shipment of antibiotic-treated fish for ultimate consumption.

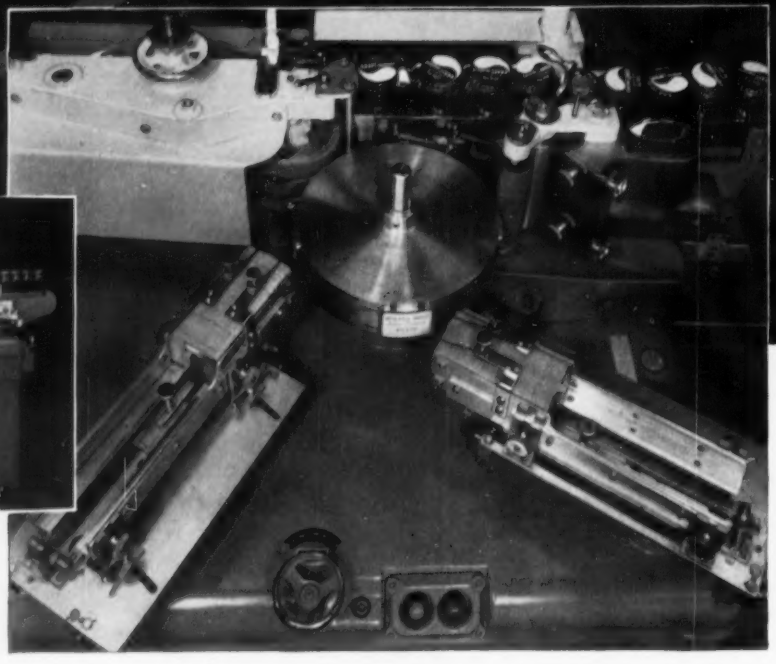
Closed circuit TV, now reasonably inexpensive, is used to scan large loading docks, with these two benefits: It provides better control of loading operations, and it prevents pilfering.

Stunning guns are being used experimentally by some beef packers. They are accurate, make no hole in hide, and are less likely to damage brain. Gun cartridges cost 5¢ each, and time is required for loading.

Lightning Labelers

DESIGNED FOR TOP SPEED APPLICATION

on round containers



Speeds up to 300 per minute

Write for Bulletin 129

Operating on an all mechanical, constant motion principle, these machines speed the labeling operation through their simplification of design and their own uniquely direct method of application.

A helical intake feeds and spaces the containers which travel straight through on a platform chain conveyor.

From a vertical gluing roll a uniform film of adhesive is transferred to segments of a glue cylinder. These glue faced segments then "pick off" labels from the reciprocating magazines. The glued labels are directly transferred to the containers by means of a rotating transfer cylinder. The containers then roll between pressure belts and a stationary pad which properly "wipes" down each label.

Straight through without stop or pause — that's the answer to the Lightning Labeler's (1 and 2) smooth, uninterrupted delivery of containers with accurately registered, smoothly adhered labels. If your container is round, the Lightning's a machine you should look at, by all means!

PNEUMATIC SCALE CORP., LTD., 91 Newport Ave., Quincy 71, Mass. *Also: New York; Chicago; Dallas; San Francisco; Los Angeles; Seattle.*

PNEUMATIC** ***Packaging and Bottling Equipment

CREATING THE PACKAGE

Latest Foil Trays Outdo Kitchen Pans

- Double boiler percolates product with steam
- Corrugated fryer separates food from fat

EXPENSIVE PACKAGING certainly seems justified today for a premium product—where the added convenience outweighs the increased cost.

This theorem has certainly proved true in the case of two aluminum foil trays (Ekco-Alcoa Containers, Inc., Wheeling, Ill.) that have jumped sales for two specialty meat products by actually out-performing the kitchen pans that they replace.

First of these containers is a special, three-part tray—actually, a throw-away double-boiler—that is now applied to corn beef by Gunsberg Bros. Packing Co., Detroit.

This meat is a high priced item. However, it has had a drawback heretofore—the long simmering period that the housewife had to supervise before the meat was ready to eat.

Pre-cooking and slicing by the processor and the new convenience package (see top photo) have solved this problem.

Three-Piece Container Turns the Trick

The container was originated by Sutherland Paper Co., Kalamazoo, Mich. It is composed of two trays and a solid lid—all composed of .00035-in. foil. Outside dimensions of the tapered unit are 8x5¾x1⅛ in. The bottom tray has a full-curl rim. The top tray—perforated with 15 holes—is flanged and suspended inside the bottom tray. The cover is crimped on to the assembly with automatic machinery.

At Gunsberg, 6 oz. of sliced, precooked corn beef brisket are loaded in the top tray and 4 oz. of water are deposited in the bottom unit. Completed trays are manually placed in individual cartons and frozen.

The carton (Sutherland Paper Co.) is a reverse-tuck style with slits in the tucks, and is treated with hot wax on the inside. It is formed from .015-in. bleached sulphite board, laminated to .00035-in. foil.

The foil is specially prepared for off-set printing, and is lithographed in four colors (yellow, red, blue, and white). Back of the package contains full instructions for preparation. And the foil tray lid has a stamped panel that directs the housewife to these instructions.

Preparation in the home is simplicity itself. Consumer merely places frozen tray on a stove burner and turns back one end of the lid.

Water in the lower tray melts, then turns to steam and percolates up through the perforations in the upper tray, heating the corn beef in minutes.

The second foil package is simpler in design, but offers striking, product visibility in addition to cook-in-the-pan convenience.

DISPOSABLE double boiler and sliced, pre-cooked meat slash preparation time for corn beef brisket.

CORRUGATED tray keeps fatty foods separate from grease. Plastic lid boosts impulse-purchasing advantage.

This container is now being used by several meat packers—among them Stahl-Meyer, Inc., N. Y. C., and Sugardale Provision Co., Canton, Ohio—for brown-and-serve sausages. It has also been applied to fishsticks.

Principle convenience feature of this .00035-in. tray is a corrugated bottom that permits fatty foods to be cooked, yet keeps them separate from the liberated grease. Certainly an advance over the conventional frying pan.

Ideally, this calls for loading the product perpendicular to the corrugations. However, some sausage packers place them parallel. And Stahl-Meyer uses a combination of the two methods in its 8 oz. package (see second photo). To boost sales appeal, this

we follow tried-and-true recipes too...

for VICTOR BELTING

Exact measures of the best materials – careful processing techniques – they're as much a part of making Victor Belting as they are of making your food products.

To make sure that we're following the *right* recipes, our research department keeps careful, continual checks on *everything* that goes into Victor Belting and *every purpose* for which it's used. That's why – with complete confidence – we recommend for *your* food handling:

VICTOR SUPRENE ... special-woven cotton duck belting thoroughly impregnated with exclusive Neoprene compound. Waterproof, highly resistant to grease and most food chemicals, smooth-surfaced, and easily cleaned.

VICTOR 475 ... highest quality solid-woven cotton belting impregnated and coated with a special Neoprene compound. Developed for use where laboratory cleanliness is a *must*. Washable with hot water or steam. Resists rancidity and deterioration.

For food handling the modern sanitary way select from –

A COMPLETE LINE Including:

• Neoprene Belting • Balata Belting • Solid-Woven Belting – untreated, impregnated, coated – many widths and plies • Canvas Stitched Belting • Belting Specialties.

Victor

Balata & Textile Belting Co.

[illegible] Park Place, N. Y. 7

[illegible] W. Hubbard St., Chicago 10

Factory, Boston, Pa.

company maintains very high product visibility with a 7½-mil styrene lid (Polyflex by Plax Corp., W. Hartford, Conn.). It is converted and printed by flexographic means in four colors (red, yellow, blue, and white) by Wrapture, Inc., Flushing, N. Y.

Main problem in this operation was to develop an ink formula that would take and hold on the plastic surface.

Wrapture accomplished this task. However, it should be noted that this particular plastic is still very sensitive to scuffing. So it must be handled, packed, and shipped with extreme care to maintain high printing quality and sparkling gloss.

This lid is attached to the pan by two different methods–each designed, however, to prevent lid from popping out of place during distribution.

Stahl-Meyer uses a 4-A Automatic Closure machine (supplied by Ekco-Alcoa) that closes packages at the rate of 35 per min. This air-hydraulic unit contains a shuttle-type package feed and two dies that crimp tray flange around the plastic lid.

The top die contains twelve lances – shaped like prick-punches – that mesh with holes in the lower die. These actually perforate foil and plastic and effectively lock the two together, preventing lid from shifting.

This system, however, does not help prevent moisture vapor transmission. Thus, it is not recommended for frozen products.

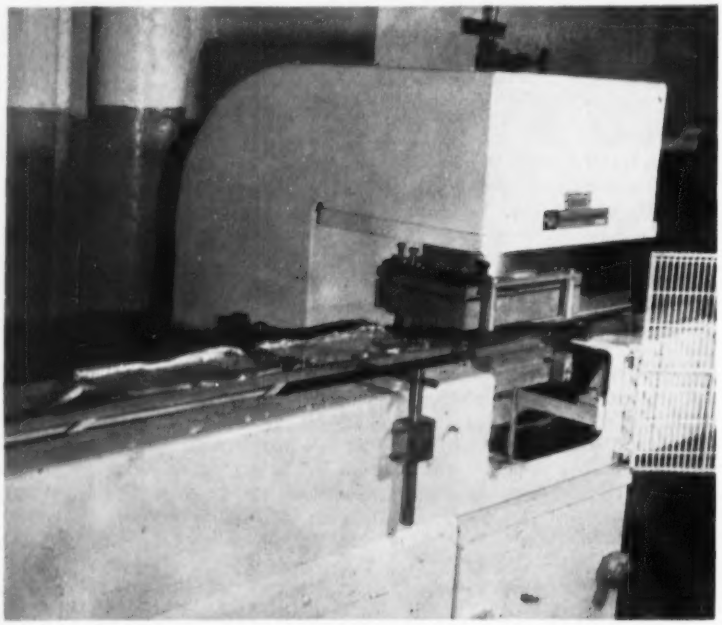
A second technique, used by Sugardale, is much more positive in this direction. Here, lid is placed on the annular groove in the foil tray, then firmly sealed in place by dies that corrugate the foil and plastic. Neither foil nor plastic surface are broken, and the resultant seal has good barrier qualities.

After removing the lid, the housewife can heat the pre-cooked product right in the tray, with no messy pans to wash up afterward.

This feature and the sparkling visibility afforded by the styrene lid proved to be striking sales advantages when Stahl-Meyer test-marketed the new tray side-by-side with its old pouch package at the same price.

This, of course, is not a true indication of what final sales will be, since the new package is definitely more expensive, necessitating a higher retail price.

But the definite enthusiasm shown by the consumer for this type of disposable cooking container, wherever used, is significant–and points up the current trend toward functional packaging.



SINGLE-HEAD closing machine for corrugated tray secures plastic lid by means of punch-equipped or corrugated dies. Processor must buy dies, and rent or buy machine from Ekco-Alcoa. Automatic lid feed is being developed.

HIGH STACKER

FOR EFFICIENT HIGH STACKING OPERATION IT'S YALE ELECTRIC TRUCKS

This short Yale Electric Truck is especially geared to warehouse operations. It's highly maneuverable—extra durable—easy to maintain and operate. With smooth new Yale power lift—it stacks higher for full use of air rights, lifts faster, lowers easily. And these trucks afford maximum safety: no hazardous fumes, lowered cowl for clearer vision, and built-in dead-man control that sets mechanical wheel brakes when operator leaves truck.

Among the exclusive Yale features of this sturdy, flexible truck are magnetic Cam-O-Tactor controller; providing smooth acceleration without "jumping" a speed range—an anti-cavitation valve that eliminates channel sway. Yale Electric Trucks are equipped with automotive type hydraulic brakes.

For all the facts on new Yale K51W Electric Truck send for Bulletin 5150A.

YALE*

*REG. U. S. PAT. OFF.

INDUSTRIAL LIFT TRUCKS AND HOISTS

MAIL THIS COUPON TODAY

The YALE & TOWNE Manufacturing Co., Dept. A-464
Roosevelt Boulevard, Philadelphia 15, Pa.
Please send me Bulletin 5150A on new 3,000 and 4,000 lb. cap. Yale K51W Series.

Your name_____

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In Canada: write The Yale & Towne Manufacturing Co., St. Catharines, Ontario, Canada

Gasoline, Electric & LP-Gas Industrial Lift Trucks • Worksavers • Warehousers • Hand Trucks • Hand and Electric Hoists

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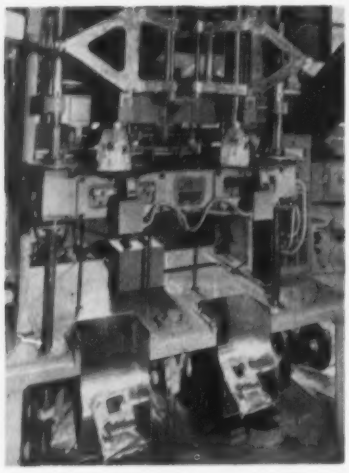
NEW PACKAGES & PRODUCTS



Automatic packager . . .

. . . half-carton shipper—

Spur Packaging of Sliced Potatoes

Pre-peeled slices of raw potatoes are automatically packaged in polyethylene at the Riverhead, N. Y., plant of Eastern National Foods. The packaging is just one step in the continuous line which grades, peels, slices, and packs the vegetables in 1-lb. bags.

The slices are refrigerated, not frozen, and are marketed under the Blue Goose label.

The polyethylene film helps keep the product moist and tender.

Eastern's processing begins with a specific gravity selector that separates potatoes according to density. The most dense vegetables are selected for slicing. A caustic solution then softens the outer skin for easy removal in a washer-scrubber.

The sliced potatoes are placed in a preservative bath, then mechanically sorted out and conveyed to the automatic packaging machine. The machine weighs out the proper amount of slices, drops them through a stainless steel tube around which a polyethylene tube is formed.

A bag is made by heat-sealing top, center, and bottom seam around the slices. A conveyor then carries the sealed bags to a packaging station where they are packed in cartons.

Polyethylene is supplied by Bakelite Co.

Circle 22C on Reader Service Card

RECENT DEVELOPMENTS of interest to food men include (top to bottom): Carling Brewing Co.'s new Stag beer label, combining simplicity with bright color; Specially designed for salad packaging is Mutual Plastic Mold's 16-oz. clear Tru-Weight container (22A); Pre-cooked entrees for two processed by Birds Eye have been introduced in pot roast of beef, beef stew, sliced turkey, and haddock in white sauce; Latest Royal gelatin flavor is blackberry, high in Vitamin C content; Ontario's St. Lawrence Starch Co., Ltd., is using round non-drip cans for its pure corn oil. The 15- and 25-oz. can are made by American Can Co. (22B)

Circle key numbers on Reader Service Card

Introduces Macaroon Mix

Betty Crocker's newest mix, Coconut and Chocolate Coconut Macaroons, is now in full national distribution.

Preparation is simple. The consumer adds water, stirs, then drops the mix onto the specially treated paper contained in the package. The paper, sprayed with tiny particles that repel caramelization, prevents sticking and saves the consumer the trouble of washing the pan.

pushbutton hot cocoa . . .

UNIQUE NEW VENDING MACHINE DISPENSES LITTLE PACKETS OF NESTLE'S HOT COCOA. STANDARD FOUNTAIN SUPPLIES HOT WATER. FRESHNESS AND FLAVOR ARE ASSURED BY RIEGEL'S PRINTED POUCHPAK*. *T.M.

Protecting the sales-winning qualities of fine products is only one of the many functions of Riegel papers. Saving money is important, too. Riegel does it for you by creating the right combination of the most efficient packaging materials . . . and by "tailor-making" the paper to run and seal at high speeds on your machines. Tell us what you want paper to do for you. Riegel Paper Corporation, P.O. Box 170, Grand Central Sta., New York 17, N. Y.

Riegel PROTECTIVE PAPERS FOR PACKAGING

GLASSINES AND GREASEPROOFS
Plain • Waxed • Printed
Lacquer-Coated • Laminated

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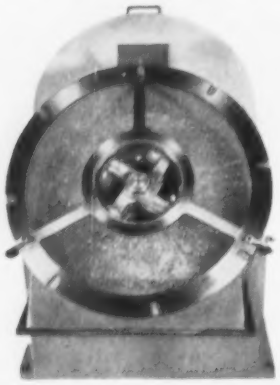


Rietz Angle Disintegrator with top removed for viewing illustrates 3 major advantages.

1. Efficiency of 360° screen:
demonstrated by even dispersion of disintegrated pulp in bowl area surrounding screen.

2. Hammer-like breaking action of rotor:
note unbroken material at moment of impact about to be disintegrated.

3. Rapid grinding action between rotor and screen:
demonstrated by large, cleared screen area between rotor hammers.

Rietz Angle Disintegrator applications include:

Wet or Dry Grinding of Difficult Materials—Fine Pulping—Shredding—Fine Dispersion—Blending—Homogenizing—Dissolving of Solids in Liquids

As a sanitary unit, available in 4" to 18" rotor diameters, it finds a wide range of applications in both food and chemical industries.

Literature on Rietz Angle Disintegrators may be obtained from Rietz Manufacturing Company at either West Chester, Pennsylvania or Santa Rosa, California.

Packages & Products

Family-Size Pop Bottle

Developed to meet a consumer demand for family-size packages is Pepsi-Cola's new jumbo "hostess" bottle.

Sporting an unusual spiral design and holding four or more glasses of the beverage, the bottle was introduced in metropolitan New York early in March in an intensive advertising campaign.

TOP HONORS in the National Chip Bag Design Contest, sponsored by the Glassine and Greaseproof Manufacturers Assn. went to Crispie Potato Chip Co., Stockton, Calif. Bag was designed by Walter Landor and Assoc., San Francisco.

Circle 24A on Reader Service Card

Cola-Flavored Beer

"Sassy Brew", a flavored beer for those who don't like real beer flavor, is being processed by Weber-Waukesha Brewing Co., Waukesha, Wis.

The product is made in three flavors: cola, punch, and collins. Color is reddish. No hops are added in processing, but the beverage will hold a head and has indefinite shelf life.

Alcoholic content is about the same as regular beer.

Adds Fudge Mix

A handy fudge mix has been added to the Junket line. Made with a new patented process, the product is said to give more uniform sugar crystals, providing a finer flavor and texture.

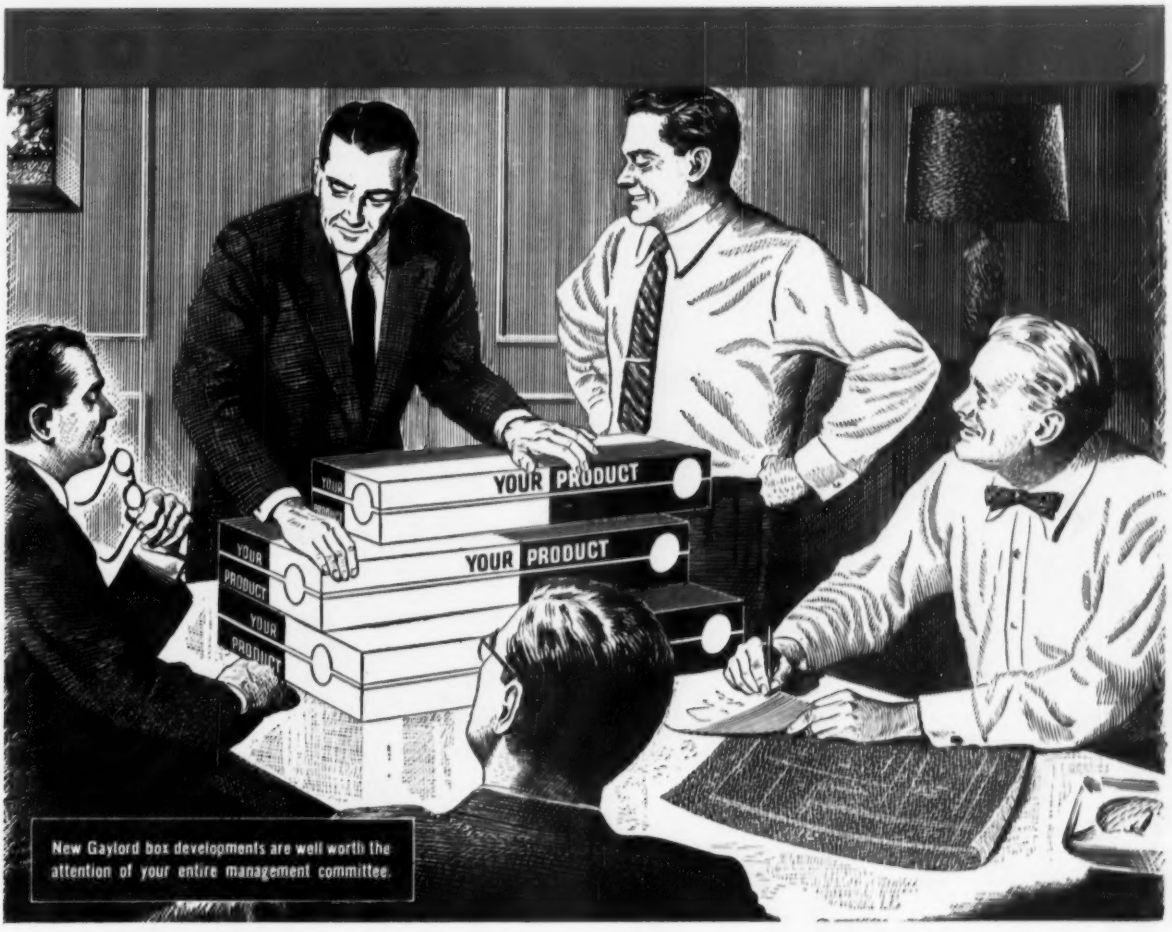
The mix is prepared by heating it with water and butter. Four minutes is the preparation time.

Super-Convenient Chicken

Armour and Co.'s Pan O'Gold buttered frying chicken offers the consumer a number of built-in conveniences. It is ready for oven cooking exactly as purchased. It may even be heated in the package, an aluminum foil tray colored gold, making it acceptable as a serving dish.

The chicken is cut up, dipped in batter, breaded with Pepperidge Farm breading, then buttered, all before purchasing. Giblets are packed with the parts.

The new product will be introduced in seven markets this month.


YOUR PRODUCT
YOUR PRODUCT
YOUR PRODUCT
YOUR PRODUCT
New Gaylord box developments are well worth the attention of your entire management committee.

ARE YOUR BOXES 1957 MODELS?

How long since you've reviewed your boxes? Packaging development moves fast. Boxes can become "dated" in just a few years.

Gaylord is constantly developing new protective designs, using new specialized materials, new engineering techniques, new box-making methods, new printing ideas.

Your nearby Gaylord packaging engineer will help you up-date your boxes . . . make them work harder, look handsomer, pay off better for you. Call him now.

Gaylord Boxes

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

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Where valves need 9 lives...

STRONGER J-519 SPINDLE
of high tensile bronze exceeding 60,000 lbs. tensile strength. Tough to withstand excessive stresses. Hard to assure long wear. Large in diameter, with extra length of threads. Head is crowned for friction-free bearing on plug.
HEAVY BONNET
has unusually long thread bearing surfaces for spindle engagement, reducing thread load and increasing service life. Centering lip or ring fits snugly into body and acts as internal brace. Bonnet bronze exceeds standard specifications.
BACK SEATING PROTECTS THREADS
Top of spindle head is machined to provide a tight seal against back seating surface of the bonnet when valve is fully open; permits repacking under pressure. This location of back seating joint protects operating threads when valve is wide open.
500 BRINELL PLUG AND SEAT RING
of special JX500 Chromium Stainless Steel. Accurately machined, mirror-smooth seating surfaces assure absolute tightness and long life. Wide, steep seating surfaces permit extremely close regulation of flow and vapor-tight closure.
EXTRA HEAVY BRONZE BODY
liberally proportioned for extra strength to resist all pipe strains. In 150 lb. valve, bronze exceeds specifications of ASTM B-62. In 200 and 300 lb. valves, bronze exceeds specifications of ASTM B-61.
JENKINS FIG. 576-P
Plug Type Armor Seat
Bronze Globe Valve

Install this JENKINS...made to defeat valve-killers

HERE are just five of the eighteen ways by which Jenkins Plug Type Valves have been engineered for maximum wear in valve-killing services. For any close-control steam service like drains, bypass lines, drips, blowoff, throttling, bleeders . . .

Or where abrasion, entrapped pipe chips, scale or rust tubercles are a problem . . .

You'll cut maintenance and replacement costs by specifying *"Jenkins Plug Type, with the 500 Brinell Stainless Steel Armor Seat"*. In the Jenkins Catalog are 150 lb., 200 lb. and 300 lb., Globe and Angle, screwed or flanged end valves in a full range of sizes. And, they are available quickly from local distributors' stocks.

WRITE us, or ask your Jenkins distributor for descriptive folder No. 202-A. Jenkins Bros., 100 Park Avenue, New York 17.

JENKINS
LOOK FOR THE JENKINS DIAMOND
VALVES
SINCE 1864 TRADE JENKINS MARK

Sold Through Plumbing-Heating and Industrial Distributors

Packages & Products

Switches to Pouch

TNT Food Products, Lawrence, Kansas, has switched from lithographed cans to a laminated foil pouch for its hulless popping corn. The heat sealed pouch—of foil, paper, and polyethylene—helps guard against moisture loss as well as providing an attractive package.

Each 3 oz pouch make 3 qts. of pop corn.

Frozen Baked Potatoes

Cutting packaging costs for the processor and adding convenience for the consumer is Makpie Food Co.'s carton for frozen baked potatoes.

Package consists of a foil tray and paperboard folder. An acetate window in the folder gives the consumer a view of the new heat-and-serve product.

The carton is a product of Continental Can Co.'s Robert Gair Div.

Circle 27A on Reader Service Card

Chicken Plus in Pie

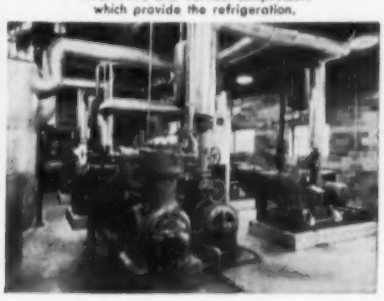
Reported to have 50% more meat than standard quick-frozen chicken pies is a new product of C. A. Swanson and Sons currently being test-marketed in the New Jersey area. The 8 oz. pie, priced somewhat

The new, modern, up-to-date cold storage plant of Higley Cold Storage, Inc., Mason City, Iowa.

HIGLEY
COLD STORAGE, Inc.
Mason City, Iowa

View of the 400,000 cu. ft. refrigerated storage room.

Vilter VMC and Vertical compressors which provide the refrigeration.



Q. How does a modern cold storage plant keep in tune with the times?

A. Install Vilter REFRIGERATION that's highly efficient and

costs less to own*

The new Higley cold storage warehouse contains 400,000 cu. ft. of refrigerated space, one-fifth of which is partitioned off as cooler storage, but piped heavy enough for possible use as a freezer.

All refrigeration equipment in this modern plant was furnished by Vilter—the quick freezing operation is handled by a Vilter Blast Freezer which freezes up to 42,000 pounds of turkey or other products per day. Refrigeration for the Blast Freezer is supplied by a 2-stage Vilter ammonia system. The first stage consists of a Vilter twin cylinder booster compressor and a four-cylinder VMC booster. Second stage compression is handled by a six-cylinder VMC compressor. Another Vilter two-stage ammonia system supplies the refrigeration for the 5,000 feet of Vilter Zer-O-Disc Fin Coil used in the storage rooms. The first stage consists of 2 six-cylinder VMC's and the second stage of a six-cylinder VMC. Two Evaporative Condensers provide the condensing surface for both systems.

Protective devices include not only the standard oil pressure failure, high and low pressure cut-out, capacity reduction and unloader switches, but also crankcase heaters, and a completely integrated electrical control system for fully automatic operation of the engine room equipment.

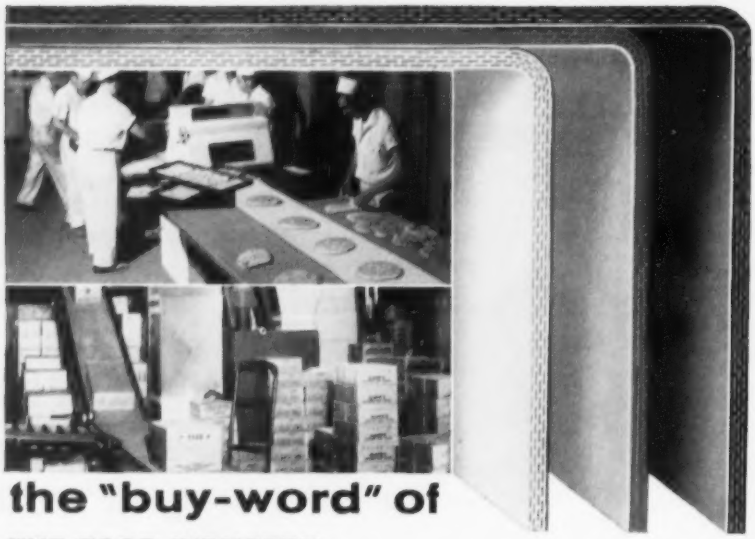
* Savings in low first cost are not the complete answer when considering the installation of refrigeration equipment. But savings in terms of years of extra service, reliable performance and minimum maintenance—that's where Vilter excels in low-cost ownership.

Vilter®
QUALITY CRAFTSMANSHIP that lasts...
ENGINEERING DESIGN that guarantees performance

REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY, Milwaukee 7, Wisconsin

Air Units • Ammonia & Freon Compressors • Booster Compressors • Baudelot Coolers • Water & Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice & Polarflake Ice Machines



the "buy-word" of
THE FOOD INDUSTRY

GLOBE *Neoprene* BELTING

No wonder Globe Neoprene Belting is on the lips of every outstanding food processor. It insures protection of foods and your firm's good name whenever you have a problem of conveying, elevating or transmission.

GLOBE WHITE NEOPRENE withstands food oils, cooking oils, fats, greases, acids, alkalis, and practically everything that harms ordinary belting. Food particles can't cling to its tough, durable, but satin-smooth cover that cleans with a quick wipe of a damp cloth and STAYS clean. It absorbs no odor, flavor or taste and NEVER gets rancid. Any width up to 48-inches and in 2 to 6 ply construction.

GLOBE BLACK NEOPRENE — with the same construction features — for conveying boxes, cans, crates, canned or bottled goods.

GLOBE ROUGH SURFACE NEOPRENE — White, "Ruff Top" or brown "Kling Top" for incline or decline conveying of foods.

OTHER GLOBE PRODUCTS FOR THE FOOD INDUSTRY:

WHITE SOLID WOVEN COTTON BELTING • IMPREGNATED PRESS-CURED BELTING • WATERPROOF AND WAX TREATED BELTING • KANRY-TEX BELTING • PLASCELL BELTING • CELLULOSE BELTING • STITCHED CANVAS BELTING • ROUND BRAIDED ENDLESS BELTS • HEVALOID ENDLESS BELTS • WOVEN ENDLESS BELTS • CLEANER AND SIFTER BRUSHES • WEBBINGS • HOISTING SLINGS • BELT DRESSING

When you need belting, call a Globe engineer.

GLOBE WOVEN BELTING CO., INC.
1400 CLINTON STREET • BUFFALO 6, NEW YORK
KNOWN FOR QUALITY THE WORLD OVER

Packages & Products

higher than the standard Swanson pies, will be sold under the Swanson Gold Label trade name.

Gold Motif for Soda

An unusual promotional idea is used by Hoffman Beverage Co. in its distribution of Hoffman Golden Club Soda in the New York City area. Each 7 oz. bottle is individually wrapped in foil in an attractive gold 6-bottle carrier. Initial delivery was made by a blond in a gold lame cocktail gown in a chauffeur driven gold Cadillac.

Mexican Foods in Foil

Foil insures product quality for two new Mexican specialties marketed by Rosarita Products Co., Mesa, Arizona.

A Mexican style dinner of enchiladas, beans, rice, tamale, and chili con carne is overwrapped with Bencoseal printed with translucent inks. The Bencoseal is a new heat-

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everything you sell
deserves the protection of

WAXED
GLASSINE

Today's brand standings begin with your packaging check list!

More Sales Power Per Package ...with Waxed Glassine

Perfect solution to inner and outer food packaging problems! Proved best for printing, performance, compatibility, strength, sealing, stability, permeability—plus lower basic cost!

THE POWER OF WAXED GLASSINE OUTER WRAPS:

- **More eye appeal**—Sparkling surface provides perfect background for brilliant, appetizing illustrations, lets you use entire package for powerful all-over sales-winning designs that prompt purchase!
- **Billboards your brand**—Every package is a *billboard* generating impulse sales and assuring repeat customers with its fresh, inviting look, strong appetite appeal and stand-out brand identification!

INNER AND OUTER WRAPS OF WAXED GLASSINE:

- **Extra flavor protection**—Safely seals in all that desirable just-made goodness, keeps customers coming back for more.
- **Extra freshness protection**—Self-sealing Waxed Glassine protects against moisture invasion, maintains freshness and texture best for longer shelf and pantry life. Easier to open, easier to reclose, contents keep fresh and tasty!
- **Extra grease protection**—Waxed Glassine wrappers resist penetration by fats, oils, shortenings. No more rancidity problems! Package stays clean, inviting, colorful!
- **Extra strength**—Waxed Glassine passes rugged test of delivery, in-store and consumer handling! Made stronger to stack better, it cuts down crumbling, breakage, ripped wrappers and returns!
- **Low cost**—Lower basic costs plus constant, dependable supply combine to produce an economical package that reaches out and sells!

Waxed Glassine teams up with the experience, facilities and service of the nation's top converters, to give you modern packaging and product protection that pays off in bigger packaging business—and the job doesn't stop here!

Traffic-stopping *designs*, actual *samples*, proven *sales ideas*, complete *cost sheets* show how Waxed Glassine pays off in better packaging, higher brand profits! See your Waxed Paper salesman, or write or telephone us direct.

W
PROTECTS FRESHNESS AND FLAVOR
P

WAXED PAPER MERCHANDISING COUNCIL, INC. • *38 South Dearborn St.* • *Chicago 3, Ill.* • *Telephone: STate 2-8115*

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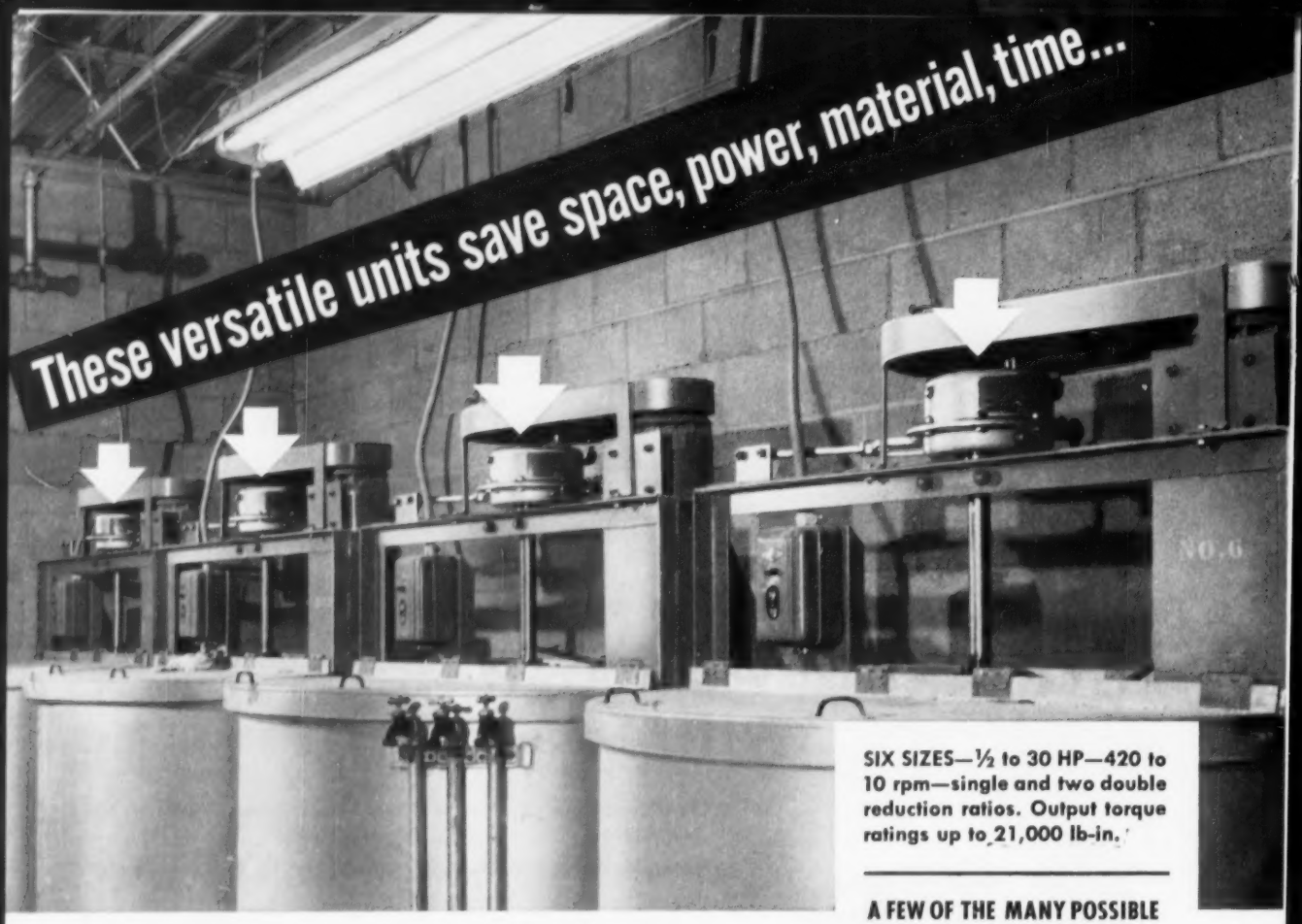


SIX SIZES—½ to 30 HP—420 to 10 rpm—single and two double reduction ratios. Output torque ratings up to 21,000 lb-in.

FALK ALL-STEEL Shaft Mounted Drives

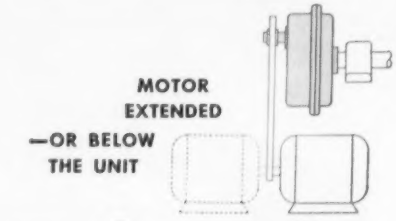
The photograph above typifies the way FALK Shaft Mounted Drives furnish the economical solution to problems of efficient speed reduction in a limited space. Within their rated capacities, these versatile reducers are designed to drive any machine and to fit any space requirement.

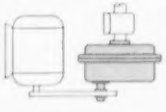
FALK Shaft Mounted Drives mount on the driven shafts and are connected by V-belt or chain to any convenient rotating power source. Unlimited choice of output speeds between 420 and 10 rpm is made possible by varying the ratio of driving sheaves or sprockets.

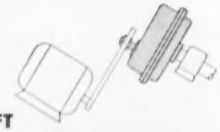
These units, with precision-cut gears of highest efficiency, use a minimum of power. They need no adjustable motor bases or slide rails; thus they save material. And, because they are readily available and easily installed or moved, they save time. Best of all, they are backed by FALK's unmatched experience in precision-gear manufacture.

Promptly available from factory and distributor stocks, from *coast to coast*. Ask your Falk Representative or Distributor for details—or write us for **Bulletin 7101.**

A FEW OF THE MANY POSSIBLE DRIVING ARRANGEMENTS







THE FALK CORPORATION, 3001 W. CANAL ST., MILWAUKEE 1, WIS.

Representatives and Distributors in Most Principal Cities

Manufacturers of

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

FALK

...a good name in industry

scalable foil-wax-tissue lamination.

The newest idea in "cook-in" pouches is a package used for six pre-cooked tamales. One side is of acetate (reverse-printed in four colors), aluminum foil, and extruded polyethylene. The transparent side is of reverse-printed Mylar, to which polyethylene has been extruded.

Both packages are made and printed by Shellmar-Betner Flexible Packaging Division, Continental Can Co.

Circle 28A on Reader Service Card

Onions Under Glass

Hungerford Packing Co. is distributing fancy boiled onions in a glass container supplied by Owens-Illinois Glass Co. Processors also market a line of canned whole onions.

Circle 31A on Reader Service Card

New Product Shorts

Grape Jelly is now packaged in 10-oz. glass jar by Welch Grape Juice Co. New size supplements the 20 oz. size.

Family-Size Can is new Libby, McNeill & Libby package for corned beef hash. The 24-oz. can has already been used for beef stew, chili, beans, and spaghetti.

Giant Quart Cans are now used for P. Ballantine & Sons beer. The flat-top cans are reported to cool faster than bottles and save refrigerator space.

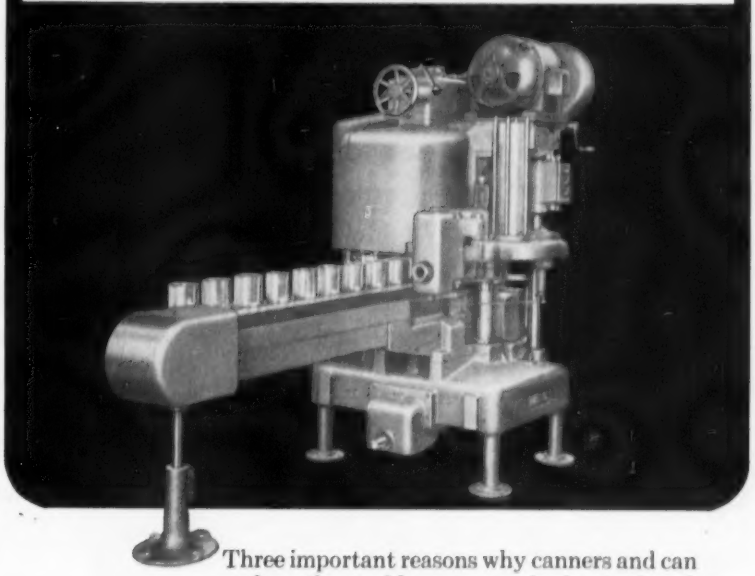
Frozen Fish'n Chips is now processed by Birds Eye. Each carton serves two.

Flip-Top Box is new package for Knox Gelatine Co.'s unflavored gelatine.

Apricot and Orange Juice blend called BC is distributed by Realemon-Puritan Co. in 46-oz. can.

Swing To...

ANGELUS
CAN CLOSING MACHINES



Three important reasons why canners and can makers the world over are swinging to Angelus Can Closing Machines — LOWER FIRST COST — LOWER MAINTENANCE — HIGHER PRODUCTION.

The outstanding performance of Angelus seamers is the result of more than 45 years of experience as a specialization. Angelus is the nation's only manufacturer exclusively producing automatic round can closing machines. A wide range of Angelus seamers and accessories meet all round can closing requirements for liquid or solid products from 30 up to 500 cans per minute.

Write today for complete details. Specify products, can dimensions and capacity requirements.

ANGELUS
Sanitary Can Machine Company
Cable Address "Angelmaco" Western Union Code

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Republic helps her pour full of

To capture and preserve the true, rich flavor of fruit juices, the frozen-fruit-juice industry had to guard against any trace of metal pick-up. Leading processors quickly discovered the most economical way to lick the problem: install stainless steel tubing in all equipment where contamination is a factor.

In the first uses of stainless heat exchangers for the manufacture of frozen juices, designers specified these units to be equipped with Republic ELECTRUNITE® Stainless Steel Tubing. The tubing has not only protected the flavor of their juices, it has completely resisted the corrosive action of fruit acids. And it's so easy to clean.

Republic ELECTRUNITE Stainless Sanitary Tubing is used extensively in both the juice and dairy processing industries where clean, bacteria-free lines are required. If you have a contamination problem or work with corrosive liquids, you'll want to get all the facts on Republic ELECTRUNITE.

It's produced in sizes ¼" through 4". In the popular sizes, it's available with the I. D. polished, O. D. polished, or both. Unless otherwise specified, Republic Sanitary Tubing is produced to specification ASTM-A-270. Be sure to get the new free 60-page brochure on Republic's complete line of stainless steel tubing and pipe. Simply indicate on coupon.

NOW! Bright Annealed

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

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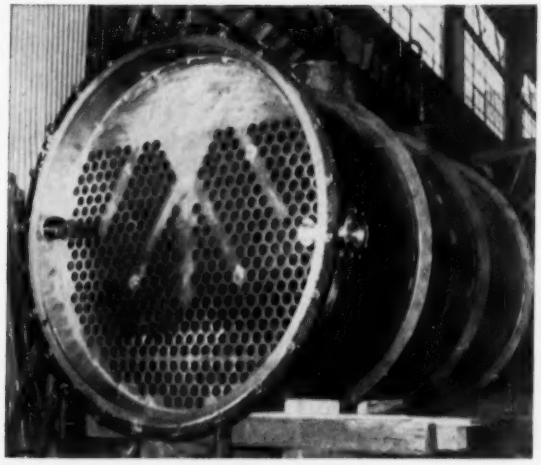
pitchers flavor



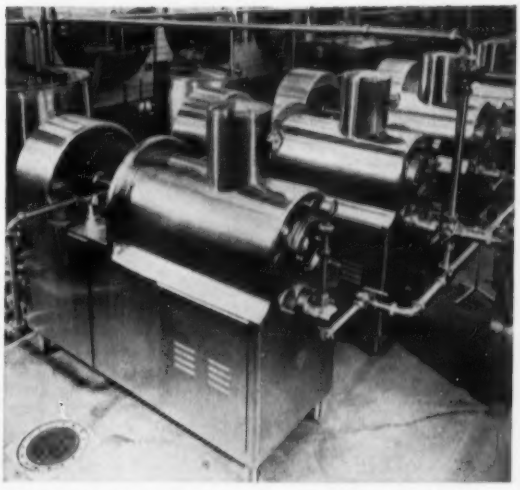
E J KELLEY & ASSOCIATES, INC., prominent west coast designers and manufacturers of heat exchangers, condensers and evaporators for the frozen-juice industry, like the uniform quality of Republic ELECTRUNITE Stainless Steel Sanitary Tubing. Its uniform ductility makes rolling-in easy. Uniform concentricity and wall thickness are completely dependable.

Tubing to save polishing costs

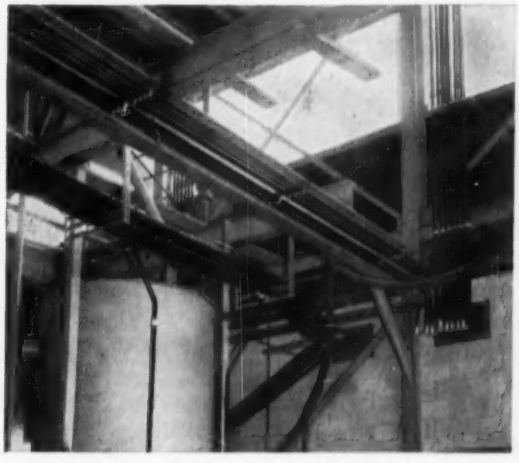
Now the purchaser can get tubing with a dense, lustrous finish without paying high polishing costs thanks to Republic Steel and Tubes Division's new, continuous bright annealing furnace. The furnace produces a tube with a hard, high-quality finish in sizes from ¼" through 4" O.D. Like all of Republic's full line of stainless tubing, bright annealed tubes are produced from flat rolled Republic ENDURO® Stainless Steel, cold formed into a tubular shape, and joined by the "inert-arc" welding process. Every foot of tubing has uniform wall thickness, is perfectly concentric, meets every requirement called for by ASTM and ASME. For more information on bright annealed tubes, mail coupon.

STEEL

and Steel Products



REPUBLIC HELPS protect against contamination in all phases of the food processing industry with ENDURO Stainless Steels — available in a full range of analyses. ENDURO's smooth, hard surface offers little foothold for contaminants or bacteria. Corrosion caused by food acids and moisture is locked out. Because ENDURO is so easy to clean and keep clean, the need for costly scrubbing-compounds is eliminated. And, being solid stainless, there's no applied surface to crack, chip, flake or peel away. Your equipment-supplier has all the facts. Or send coupon.



REPUBLIC HELPS protect against production shutdowns by safeguarding your electrical wiring with ELECTRUNITE "Dekoron®-Coated" E.M.T. . . . the raceway that shrugs off corrosion. A tough coating of polyethylene encases lightweight, strong ELECTRUNITE E.M.T. in an end-to-end armor that is impervious to excessive corrosive fumes or moisture. It can be cut to length and bent to fit as easily as standard E.M.T. conduit. Joints are protected by polyethylene or vinyl-backed electrical tapes. Contact your local electrical distributor. Or send for details.

REPUBLIC STEEL CORPORATION
Dept. C-3275
3160 East 45th Street, Cleveland 27, Ohio

Please send me information on:
- ☐ 60-page brochure on Stainless Steel Tubing
- ☐ ENDURO Stainless Steels
- ☐ ELECTRUNITE "Dekoron-Coated" E.M.T.

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Ole Sage Episode

Batt put it flatly: "In my book, a man past 40 is on the downgrade!"

Can You Really Measure a Worker by His Age?

IVAN C. MILLER
"Food Engineering"

"WELCOME, B. B.—and glad to learn you hired Mike!"

This greeting came across the table from Personnel Manager Milt Sorenson as Bertram Barnastian, the baking company man, slipped into a seat at the regular luncheon of the Guff & Gripers.

Milt then explained for the benefit of the others: "You remember that I couldn't hire this 46-year-old fellow, Mike Morgan—much though I wanted to—because my company now has a pension plan and has ruled against taking on people who are over 45. However, Bert, here, was extremely interested in Mike because of his being such a seasoned, experienced man. And so he put him on."

"Yes, and he's proving to be all you claimed," said Bert. "Looks like he'll really go places with our outfit!"

The chatting around the table then eased off as the men concentrated on the meal. But when the coffee was served, Ole spoke up:

"I'm pleased, too, at what you were saying about Morgan making a good connection over at Bert's," he remarked. "As a matter of fact, the hiring concept now seems to be moving toward more favorable consideration of older workers. But there's a great distance to go. Recent studies indicate that many companies just give lip service to the idea of hiring older persons—talk instead of deed."

Ole turned to Bert. "Personally, I wish all companies had your broad viewpoint about hiring. If they did, then both unemployed older workers and industry, too, would greatly benefit. So, likewise, would all the rest of us—I mean our national economy in general."

Batt Bulwark, works manager of Mull & Mull, cocked his head. "There's one thing for sure," he bantered. "When Ole takes hold of something, he's never bashful about being all-inclusive."

Dishes were clattering, but Batt roared on over the hub-bub: "As usual, I got to take issue with Ole—particularly on this idea that industry'll benefit by hiring a lot of wornout discards!"

Batt squinted his eyes: "It may be all right for Bert and his outfit. But in my book, a man past 40 is on the downgrade." Then concentrating on Ole he challenged: "Prove the contrary—if you can!"

"Well," admitted Ole good naturedly, "there's some truth—*at least a grain*—in Batt's view of the ageing worker. Any man forced out of work for a considerable stretch tends finally to coast down hill. And that hill gets steeper the longer he's out. Temporarily, at least, his skills seem to slip away from lack of practice, and so his spirit slumps. But I don't consider it either wise or just to measure all workers past 40 or 50—or even past 65, for that matter—by such a loose rule."

Batt was belligerent. "How can you judge 'em then?"

Ole picked up his voluminous notebook. "Let's look at the record," he suggested. "I have here the composite results of many studies, among them those of AMA, NAM, NICB, USCC, and the U. S. Department of Labor.

"Views are much broader than they used to be. In general, however, employers seem to consider the younger generation as both more efficient and more adaptable than oldsters—quicker to learn, more alert. They also figure the youngsters have the most up-to-date training, through recent schooling or actual job experi-

This is a Package

. . . but this is an Ad!

CLUSTER-PAK® cartons have space for advertising to "billboard" your product . . . act as their own display

Chances are, you spend from thousands to millions urging customers to reach for your products at point of purchase. *But what do they see when they get there?* A confusing blend of competing packages? Or a sign that says, "This is what you're looking for?" The answer's clear with Cluster-Pak! Its bigger area shouts your name and message. As sure as "it pays to advertise," it pays to *put your products in Cluster-Pak!*

STRONGEST CARTON MADE

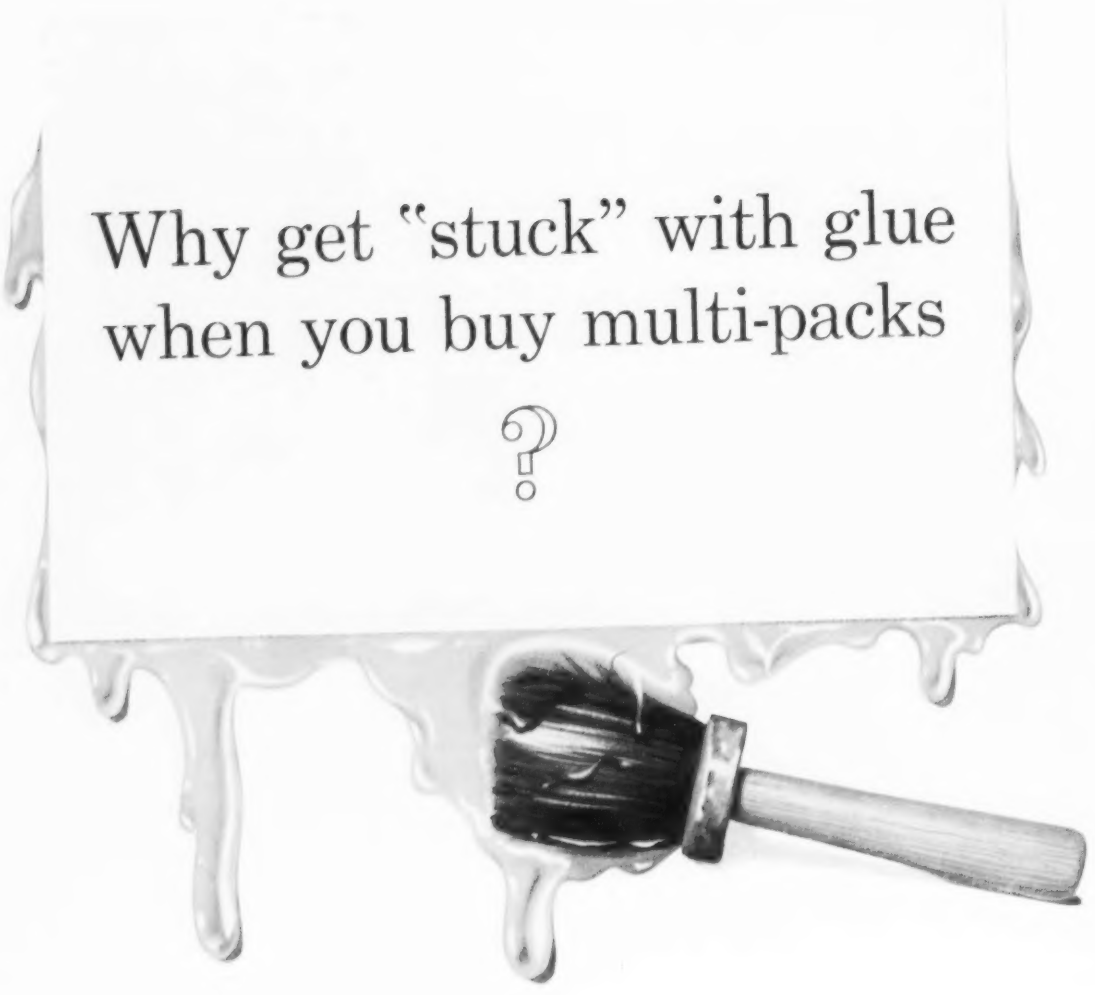
No other carton offers Cluster-Pak's double protection. You get the unequaled strength of famous Mead quality kraft combined with the world's only self-locking construction that needs no glue. *So your products are safer in Cluster-Pak!*

For full details on low cost market tests, write P. O. Box 4417, Atlanta 2, Georgia

CLUSTER-PAK IS ANOTHER CREATIVE IDEA FROM

Atlanta Paper Company

Where Packaging is Advertising



Save with *CLUSTER-PAK*®. . . the self-locking carton that needs no glue to be world's strongest!

Of course you can glue Cluster-Pak cartons if you *want* to. In fact, when we invented Cluster-Pak, we provided for glue pots on our machines. Yet! Over 700 million cans have been packaged in Cluster-Pak since then. And *not a single customer has ever used a single drop of glue!* The reason? Cluster-Pak offers the unequaled strength of famous Mead quality kraft combined with the world's only self-locking construction that *requires no glue.* So why pay for glue you neither want nor need? Instead, put your money in *quality* . . . and protect your products in Cluster-Pak. It's the strongest multi-pack carton ever made!

CLUSTER-PAK IS ANOTHER CREATIVE IDEA FROM

Atlanta Paper Company

Where Packaging is Advertising

ATLANTA PAPER COMPANY, ATLANTA 2, GA.

This insert is printed by letterpress on MEAD PRINTFLEX ENAMEL, Substance 80

"Older workers don't change jobs so often—and incur much less absenteeism"

ence, and they think they can stand the pace better."

"Amen!" thundered Batt. "With that I agree 100%."

Ole amplified: "There are still other reasons why industry prefers to hire them young. Take training. Regardless of the new employee's age, some instruction seems inevitable. And in the future, that need is seen increasing in both extent and cost.

"It's not difficult here to rationalize industry's view. It's plain that the investment in training an older worker must be liquidated in fewer years, and thus at a much higher annual cost, than if the employee is trained when 20 or 30 years old, it being presumed that he'll stay on with the company.

"Some other objections," stated Ole, "center on the contention of increased costs of workmen's compensation, group insurance, and retirement plans. All these were mentioned at our last meeting. Still another factor cited is the policy of so many organizations of filling vacancies by promotions from within. Thus, openings for older workers tend to be restricted to unskilled jobs at the very bottom.

Batt beamed. "Just as it should be!" he loudly proclaimed.

"Also," persisted Ole: "The argument is commonly advanced that older employees have to retire in order to open up work for the new generation, for whom there'd be virtually no opportunities otherwise."

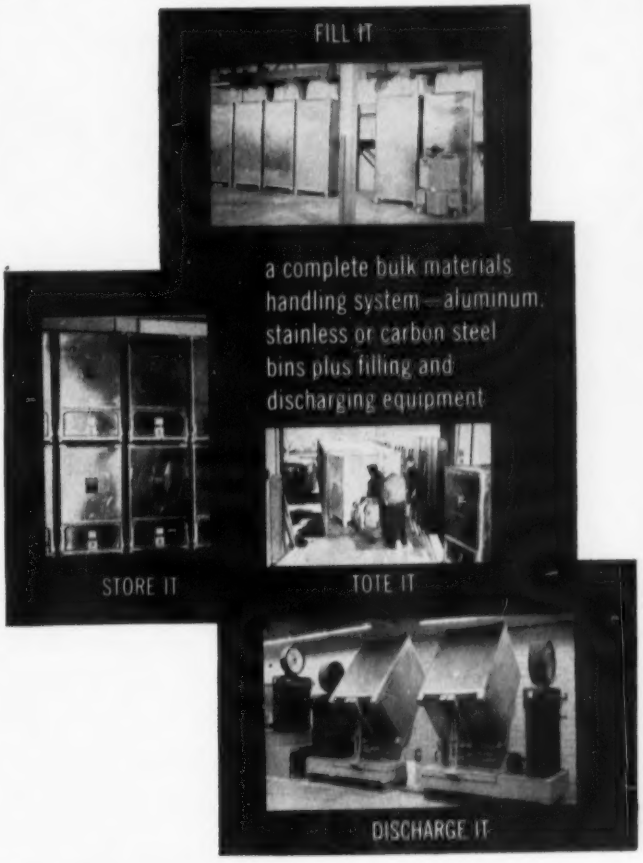
"They're sure right about that" agreed Batt.

"To the contrary," grinned Ole, "I thoroughly disagree with that view. I'll tell you why later. Just now I want to explain why I find fault, in a measure at least, with all the reasons I've just given as to why industry prefers the younger ones.

"For one thing," he said, "older workers change jobs much less often than do the young. Many studies bear that out. This gets us back to the expense of turnover, which we discussed some time back. You'll remember that turnover costs plenty." Ole cast his eye about the group for agreement. Then he added: "So, too, does absenteeism.

"A Bureau of Labor Statistics study of some 18,000 employees in a variety of industries shows clearly

TOTE SYSTEM*


FILL IT
a complete bulk materials handling system—aluminum, stainless or carbon steel bins plus filling and discharging equipment
STORE IT
TOTE IT
DISCHARGE IT

first...

- To bring you a new, more efficient method of bulk materials handling
- In number of installations
- In sanitation
- In flexibility
- In compactness
- In savings
- To offer the CONTAINER CAR which simply and cheaply solves bulk delivery problems of off-rail users

Want to know how Tote System fits your picture? Write for illustrated literature, or ask for a survey by Tote engineers. No obligation.

TOTE SYSTEM, INC.

*Tote and Tote System Reg. U.S. Pat. Off.

690 So. 7th, Beatrice, Nebraska

For more data, circle this page number on card at back →

NEW

METER WITH A MEMORY...

NEPTUNE REPEATING AUTO-STOP

Set it once... delivers same quantity of liquid batch after batch

You batch faster, free operator's time for other duties, and prevent setting errors with this *repeating* Auto-Stop meter. Set the quantity required by the formula just once, simply by pressing buttons. Then open the valve and the meter does the rest. It shuts off automatically at the exact amount. The meter "remembers"... delivers the same amount each time the valve is opened until reset for a different quantity.

Neptune meters end spoiled batches, overfilling, spillage and slow weighing. No more buckets or gauge sticks. Meters are safer, too. Hazardous liquids stay inside the pipe.

You can now meter hundreds of liquids... hot and cold water, syrups, oils, solvents, soap solutions and many chemicals. Auto-Stop meter capacities 5 to 300 gpm. Other Neptune features include ticket-printing registers and electrical Auto-Switch (shown above) to control pumps, valves or signals. Neptune Meters with simple counters or dials also available from ⅝ to 6 in. Ask for free technical metering Bulletin 566-OF .

NEPTUNE METER COMPANY

19 West 50th Street, New York 20, N. Y.

neptune liquid METERS

Branches in ATLANTA • BOSTON • CHICAGO • DALLAS • DENVER • LOS ANGELES • LOUISVILLE • No. KANSAS CITY, Mo. • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO (Millbrae) • IN CANADA: TORONTO 14, ONT.

that absenteeism—number of days lost per 100 regular work days—decreases steadily with the increase in age of workers.

"Another investigation," explained Ole, consulting his book, "demonstrates that older workers stay longer with the same employer and are justly considered more reliable than the younger ones."

"But can the older ones *deliver*? Can they *take it*?" badgered Batt.

"Contrary to most opinion, yes," insisted Ole. "And that despite the fact that after 45 the average man does slowly decline in alertness and physical dexterity and capacity. Truth is that, on the average, the productivity of typical older workers is only *slightly* less than that of younger workers. However," and Ole thumped the table for emphasis, "*quality* of the oldsters' output is in most cases superior to that of the younger group.

"In short, most older workers can hold their own in production—for these elder ones work more evenly, have better judgment, make fewer non-productive motions, and incur less waste and spoilage.

"In addition, it's been established that they retain their skills longer in life than formerly believed. Also, it's been proved that they're quite able to learn new ways of doing things. And they can adjust themselves far more easily than has been assumed.

"Of course, many tasks do still call for the vigor of youth. But the proportion of such jobs is decreasing. Apparently, the range of jobs that older persons can handle capably is much greater than has been thought."

"But," objected Batt, grabbing at a straw, "aren't the old crows always getting hurt?"

"That's another contention that's been handicapping oldsters who are looking for work. It's been believed that they are more likely to have accidents and disabling injuries than young people. The record, however, indicates just the opposite.

"Older workers have proved to be less expensive from the standpoint of accident cost than younger workers. Insurance reports indicate that workers over 45 have less than the average number of disabling injuries—the kind that mean the loss of one or more working days.

"It may be difficult for you to believe, Batt—but the studies show that workers from 65 to 74 have about the same number of injuries as those in the 20-29 age group, and far fewer than the workers in the

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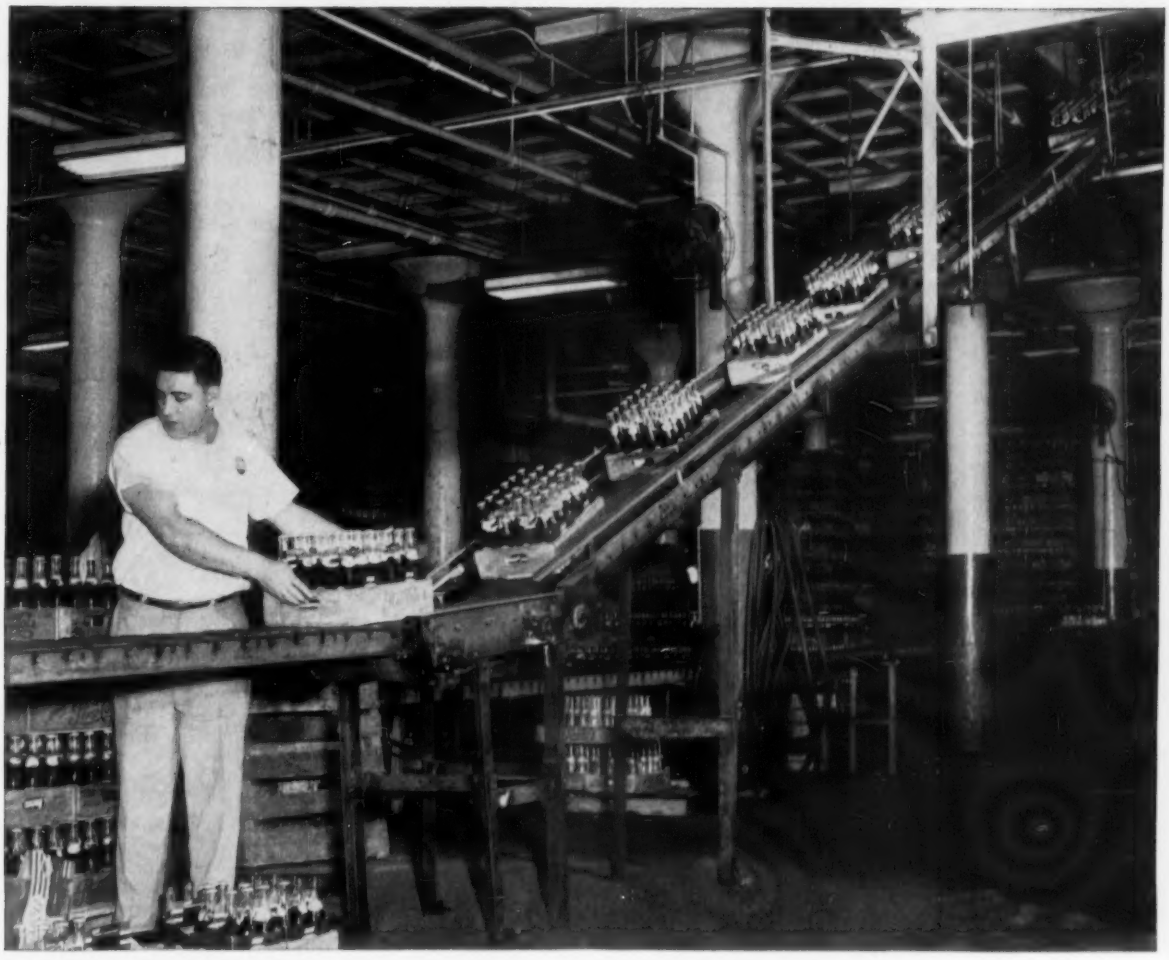
B.F.Goodrich report:



Floors used to be littered with broken glass

B. F. Goodrich improvements in rubber brought extra savings

Problem: Bottle cases riding down that conveyor from second floor to first would slip, slide, crash into each other. Rubber belts with special rough surfaces were used. But even these were soon rubbed smooth by the wooden cases. Then the belt lost its gripping power—more collisions, more breakage, more mess to clean up.

What was done: When a B.F.Goodrich distributor heard about the problem, he suggested Ribflex—an improved package-handling belt, developed by B.F.Goodrich. It's made with parallel ribs of rubber, cross cut into thousands of soft, flexible grip blocks that can bend just enough to grip what's being carried by the belt, and so hold it firmly, even on steep inclines.

Savings: Now when a case hits the Ribflex belt, it stops a moment and then rides on down—smoothly, safely, with no smash-ups, no broken bottles.

Extra benefits: Because of the flexing rib design, this B.F.Goodrich belt maintains its effective gripping action long after rough-surface belts become worn and ineffective. After 3 years and 7 million cases, the B.F.Goodrich belt shown here has outlasted other belts 3 to 1, and looks good for years more service.

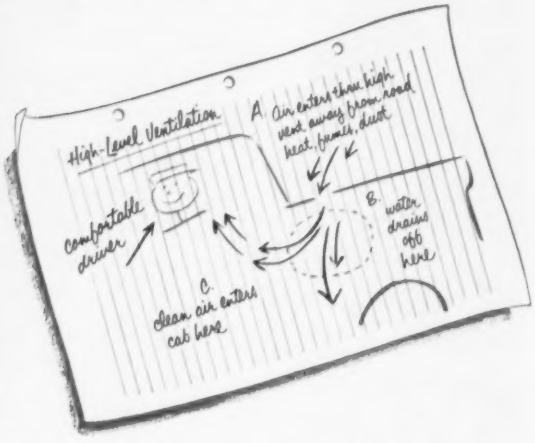
Where to buy: Your B.F.Goodrich distributor has exact specifications on the belt that solved the problem in this bottling plant. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-912, Akron, 18, O.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

For more data, circle this page number on card at back →

in a Chevy cab, even the air is better!


High-Level Ventilation
A. Air enters thru high vent away from road heat, fumes, dust
comfortable driver
B. water drains off here
C. clean air enters cab here

...more evidence that Chevrolet Task·Force Trucks are engineered better and built better for bigger savings!

These cab features give you extra comfort and safety behind the wheel, extra savings on truck maintenance. And they're proof that the most modern trucks for your money are Chevrolets!

The drawing "doodled" above shows how Chevy's High-Level ventilation provides a *comfortable* interior . . . and the numbers in the big picture point out other advantages equally as good to have around you when you haul! They include:

(1) *A roof that's specially built for safer, more comfortable hauling.* Sturdy all-steel construction adds to safety; roof's unique inner reinforcement insulates the overhead against heat.

(2) *A gleaming, durable baked enamel outside finish.* Here's the reason your Chevy's exterior will resist wear better, look like new longer! This handsome finish is available in a wide variety of colors.

(3) *A Nu-Flex seat that beats the bumps!* Deep-comfort coil springs, metered air shock damping and 3-way adjustment let you take it easy on tough jobs!

(4) *A cab that's rustproofed to last!* Doors and similar surfaces are rustproofed on the inside as well as on the outside by immersion.

(5) *Concealed Safety Steps for convenience.* Inside each cab door, they give you firmer footing, make entering or leaving the cab easier and safer.

(6) *An undercoated floor, cowl side panels and fender flanges.* Virtually all exposed surfaces on the underside of the cab are protected by an anti-rust coating.

(7) *A non-glare instrument panel to make driving safer!* The textured finish on upper portion of Chevy's instrument panel reduces blinding sun reflections, minimizes eyestrain.

(8) *A reliable 2-speed electric windshield wiper* on each side.* Powered by electricity, their action remains *constant* under all conditions.

Such advantages as these (we've shown only a few) combine to make *everything* better in a 1957 Chevrolet truck! You'll see for yourself when you visit your Chevrolet dealer's. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

**Standard in Series 5-6-7-8-9-10000 models.*

. . . biggest sellers because they're the biggest savers! CHEVROLET

CHEVROLET TASK·FORCE 57 TRUCKS

35-44 age group. Of course, the older workers do tend to be disabled for longer periods when they are injured. But this is more than offset by their smaller number of such mishaps.

"The record looks even better for non-disabling injuries—those that require first aid but which result in less time-loss than one working day. And for the information of you men here, there are 100 non-disabling injuries for every one classed as disabling.

Ole again referred to his book, then continued: "The 25-29 age group experiences the greatest number of these non-disabling injuries, with the frequency rate dropping to its lowest point for those workers—believe it or not—who are 70-74 years of age.

"Granted, most workers over 60 may have been transferred to jobs where the hazards are less than elsewhere in the plant," admitted Ole. But it should be noted here that workers from 45 to 59 sustain substantially fewer injuries than those 20-44 years old.

"And let's not forget," he accented, "that many present-day food plants are about as near safe as they can be made, and also that 85% of the accidents are caused by the individuals injured, rather than by hazards of the environment.

"Perhaps the most interesting fact is that older workers make fewer time-out trips to company clinics for personal ailments. It may especially surprise you, Batt," twinkled Ole, "that visits to clinics for complaints other than those directly related to work accidents are most frequent for those between 20 and 34, and least frequent for those 45 and over."

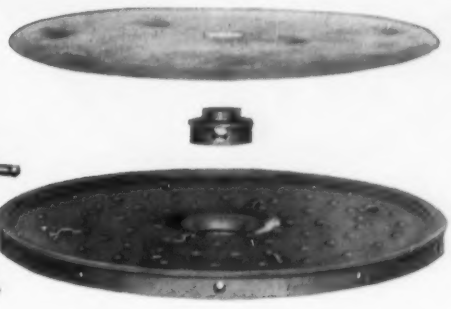
Milt now interposed: "That brings up an angle which, it seems to me, is too often overlooked: Truth is that the *attitude* of oldsters toward accidents—their deep respect for safety practices—not only protects them but it also favorably influences the younger workers, and . . ."

"Hold it," broke in Barney Hasbrook, who was pushing back his chair. "I know Ole's got still more on this. And we've not yet got to that big question of retirement. But I'm afraid we'll *all* have to retire right now—back to our respective 'salt mines,' I mean. Just look at the clock!"

"Yes," rounded out Milt, "we'll have to hold some of this—including that matter of forced-versus-voluntary retirement—until our next meeting."

No locked-in contamination with SPARKLER SANITARY FILTERS

A completely sanitary filter. Sparkler horizontal plates can be disassembled for cleaning all interior surfaces.



You can see at a glance why Sparkler filter plates are the most sanitary plates ever designed.

All surfaces, inside and out, are easily accessible for thorough cleaning. The top screen that supports the filter paper, a center separator, and the bottom plate is all there is to it. These parts can be separated without unscrewing bolts or nuts. The tie rods of the complete plate assembly holds the plate parts firmly together without danger of bypassing.

With most other types of filter plates the inner surfaces are inaccessible and cannot be cleaned; contaminating food particles are locked in and the first run of a new batch frequently must be discarded or rerun through the filter to obtain a pure product.

With Sparkler sanitary plates, a pure product is obtained right from the start, and continues pure with fine sharp filtration to the end of the filtering cycle.

Sparkler filter plates can be removed for cleaning in one unit and a fresh thoroughly clean set lowered into the filter tank. This reduces down time to a matter of minutes.

Sparkler filters are available in stainless steel, monel, nickel, bronze, or Hastelloy, steam or brine jacketed. Available in a range of capacities up to 10,000 G.P.H.

They are efficient in filtering all food products such as:—

Candy Scrap
Chicken Broth
Cider
Egg Albumen
Extracts
Flavors
Honey
Gums
Liquors
Milk
Molasses
Syrups
Vinegar
Fruit Juices
Alcohols
Beverages
Lard
Deep Frying Fats
Beet Sugar Syrup
Beer
Wines
Whiskies

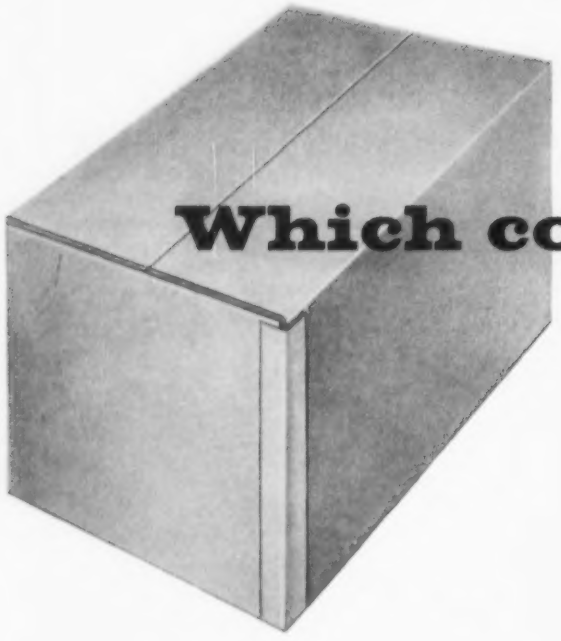
Write Mr. Eric Anderson

SPARKLER MANUFACTURING CO., Mundelein, Ill., U.S.A.

Sparkler International Ltd. with plants in Canada, Holland, Italy and Australia.
Service representatives in principal cities throughout the world.

FILTRATION ENGINEERING AND MANUFACTURING EXCLUSIVELY FOR OVER 35 YEARS.

What you should know about "manufacturer's joints" in Union Boxes.



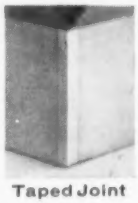
Which corner of a box

One corner is more important than the rest: where your corrugated shipping container is held together. This "hinge", or manufacturer's joint, often holds the key to your box's performance.

As the illustrations show, manufacturer's joints comprise three basic types: taped, stitched, and glued-lap. Each does a special job. Knowing which to use, and when, calls for a detailed analysis of your product and how it will be shipped.

Union Box engineers will be glad to make such a study for you. This is part of Union's complete structural design service. These fundamentals, however, are excellent guides:

Many shippers prefer tape



Taped Joint
(outside)

Tape is generally gum-backed, reinforced kraft paper or cloth, having high tear strength, especially in the lengthwise direction. Tapes are 2, 2½ and 3 inches wide and come in varying grades depending on degree of strength required.

← For more data, circle this page number on card at back

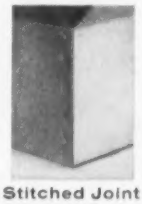
should you examine first?

Advantages: no projections. In stacking, boxes lie flat, rock less. Also, entire interior area of box can be used. The taped joint is continuous, too . . . seals out dust and dirt. And it folds to make a true box corner.

On the other hand, tape is frequently more expensive than other manufacturer's joints. It can be adversely affected by moisture also. In some cases, tape may interfere with printing.

The sturdy stitch

Frequently used for heavy items like canned goods, this joint uses steel staples driven from the outside of the box panel. It is probably the strongest "hinge", gives the most positive closure, and is not affected by moisture or cold. It is usually the least expensive.



Stitched Joint
(outside)

The closure, however, is not continuous. And, since the metal stitches may protrude inside the box, this joint is normally not recommended for fragile and prone-to-scratch articles.

The diagonal stitched joint shown is a typical arrangement. Others include vertical, horizontal, and double stitching.

Glued lap . . . the versatile joint

Flap may be adhered either to the inside or outside of the box, and to the end or side panel. Inside-flap gluing is the most popular. It is the only joint which leaves a completely uninterrupted exterior printing surface.

Like the taped joint, the glued lap joint is continuous . . . forms a true fold. Performance under adverse moisture conditions is questionable. Also, inside-lap does not give 100% clear inside-packing area.

Glued Lap Joint
(inside)

Take full advantage of Union's accumulated knowledge in constructing and recommending manufacturer's joints for shippers in every industry. Consistently well-engineered features such as these offer the surest protection for your product and your shipping investment.

union camp

Write for Union's free, informative booklet "Manufacturing Corrugated Boxes."

UNION BOXES

UNION BAG-CAMP PAPER Corporation
233 BROADWAY, NEW YORK 7, N. Y.

Factories: *Savannah, Ga.; Trenton, N.J.; Chicago, Ill.; Lakeland, Fla.*

Sales Offices: *Eastern Division—1400 E. State Street, Trenton, N.J.*
Southern Division—P.O. Box 570, Savannah, Ga.; P.O. Box 454, Lakeland, Fla.
Western Division—4545 W. Palmer, Chicago, Ill.

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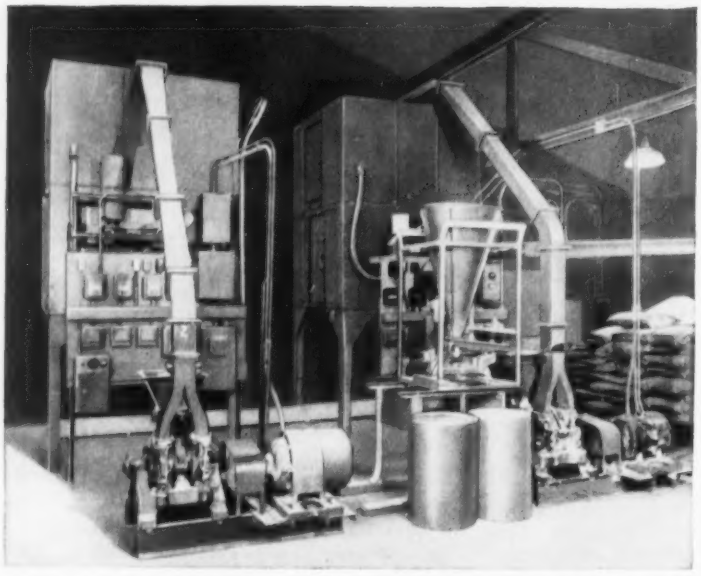
Mikro-D Twin Unit Installation

GRINDS COCOA POWDER "TO ORDER"

A. Cramer Corporation is a custom grinder, serving some of the nation's leading manufacturers of foodstuffs. To meet the problem of grinding cocoa powder to exact specifications, this busy organization relies on the quality and round-the-clock dependability of MIKRO-D pulverizing and collection equipment. As an example of just how effectively MIKRO-D equipment is performing for Cramer Corporation, a *single unit* of the two units shown here, has produced cocoa powder at 600 to 650 lbs. per hour . . . at 98-99% through 325 mesh!

MIKRO-D equipment can help you put new efficiency and economy into whatever products you grind. We'll be glad to make test runs on the unground material, and submit recommendations entirely without obligation. Whether your operation calls for a standard unit or a specially-engineered system, MIKRO-D equipment can fill all your grinding and collecting requirements.



Installation at A. Cramer Corp., Oak Lawn, Ill., consists of two #6 MIKRO-D MIKRO-ATOMIZERS, each connected with and discharging to #36-1-84 MIKRO-D MIKRO-COLLECTORS. Unit at right is used to grind sugar as well as other products.

GENUINE MIKRO-D REPLACEMENT PARTS
Available From Large Stock Within 48 Hours.

Mikro-D

PULVERIZING MACHINERY DIVISION
METALS DISINTEGRATING COMPANY, INC.
97 Chatham Rd. Summit, New Jersey

MANUFACTURERS OF PULVERIZING, AIR CONVEYING AND DUST COLLECTION EQUIPMENT

CUT OUT AND FILE

PRACTICAL IDEAS

Roll-Paper Carload Bracing—for Safe Deliveries

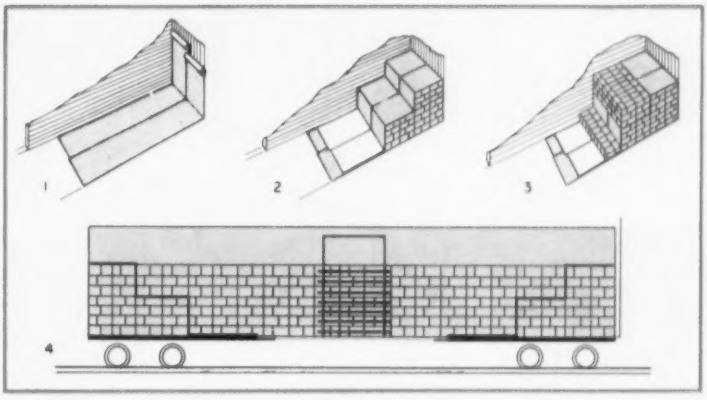
Here are instructions for carloading by the paper retaining method—a good way of keeping containers loaded tightly together in bonded block units.

The material needed (roll paper) is but a trifling expense if compared to the value of safely shipped cargo.

Start paper in car floor (see sketch 1) about 6 ft. from doorway, bringing paper up ends of car to a point a few inches above top of load. Roll up paper and tack to end of wall.

Stow containers in first two blocks to full height, those in next two blocks to half height of load (sketch 2).

Then roll paper tightly over containers and bring ends forward along floor (sketch 3). Continue stowing remainder of load to hold paper tightly in place.



Cross-section of completed load (sketch 4) shows position of retaining paper. Lading in doorway is kept from contact with doors and door posts by flush-type protection.—*A. T. Gaudreau, Management Consultant, Gaudreau, Rimbach & Assoc., Pittsburgh.*

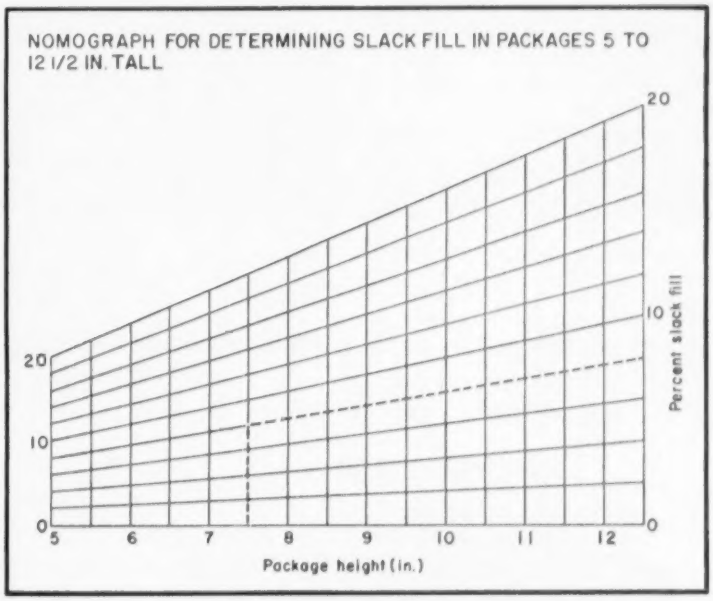
Slack-Fill Nomograph

It is often necessary to find percent slack-fill in packages of various heights. And we have now found a way to avoid the tedious calculations of converting the package size in order to figure percent slack-fill. We use a simple nomograph (right).

By using a linear plot of a right triangle the units for measuring the percent of slack-fill in any type package may easily be determined.

The base line is plotted in inches at ½ in. intervals. The height of the right triangle is set by the height of the largest size package in production, and the greatest slack fill measured for that package.

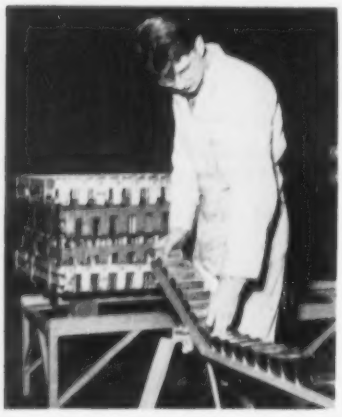
We picked 20% slack-fill of a 12.5 in. package, making each percent slack-fill equivelant to ⅛ in. of height. Straight lines were then drawn from each 2% mark to a "vanishing point" on the base line (not shown on the nomograph). The unit of measure for each percent slack-fill can then be traced directly from the graph between the base line and the slope of the triangle.



Supposing a 7.5-in. package had a ⅜-in. head space at the top. To find present slack-fill measure up ⅜ in. (dotted line) from the 7.5 in. point on the bottom scale, follow the slanted line to the right and read the answer (8%) from the right hand scale. Percent divisions for a

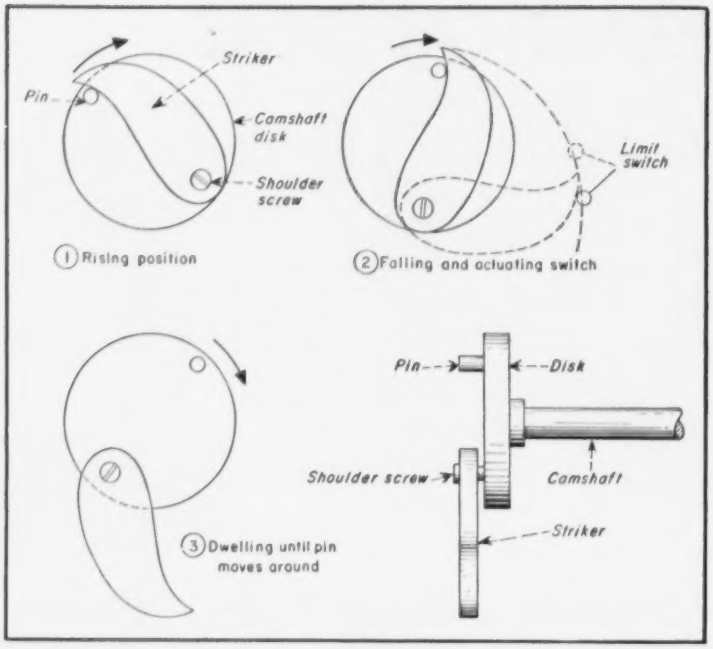
particular size package can be traced on a strip of gummed paper. This is backed with an aluminum plate of about 18-gage that has a rectangular "foot" at the base. To measure the perecent slack-fill, gage is placed in open package with the foot gently resting on top of the food, and the reading is made from the top score line of the package.

If the package is not held level with your eye an error (due to parallax) can be incurred.—*Paul F. Russell, Supervisor, Quality Control Dept., Post Cereals Div., General Foods Corp., Battle Creek, Mich.*



Basket Loading Simplified

To make the manual loading of filled cans from can-run to retort basket an easier job, we fixed a short piece of track (see photo) to the run and angled it sharply upwards. Now, without stooping, the basket-loader slides a flat, wooden paddle under 7 of the cans and easily lifts them to the retort.—*Harold Engelsen, Hilton Sea Foods Co., Seattle, Wash.*



Switch-Closing Device

Recently, one of our bakery customers had us install a cake-pan greaser in his plant. He required complete automation — of pan washer, depositor, and oven loader.

We designed the circuit and feed device so that the depositor released a pan to the greaser each time a pan was filled. This was accomplished by a limit switch, that is operated by a cam installed on the depositor. Cam makes a turn when a pan is filled.

Trouble developed when the cam stopped with the limit switch closed. This flaw resulted from the intermittent motion of the cam caused by multiple cavity filling, plus frequent shut-down of depositor.

To work properly the switch had to be closed only momentarily for each cam revolution. Also, it had to be impossible to stop the depositor with the switch closed.

We solved the dilemma with a single impulse limit switch actuator (see sketch) A disk, carrying a steel striker fastened with a brass shoulder screw, was mounted on the cam shaft. As the disk turns, a pin drives the striker until, just past the top dead center position, striker falls and closes the limit switch momentarily.

Since the switch action occurs during free fall, it is impossible to stop the machine with the limit switch closed. And the jerky, intermittent movement of the cam switch doesn't affect the results.

The depositor has a maximum rate of 10 pans per min.—*N. V. Beaman, Chief Development Engineer, J. H. Day Co., Inc., Cincinnati.*

CAN YOU USE $50?

Then here's an opportunity to get it.

Send one of your ideas to FOOD ENGINEERING. Each month $50 is presented to someone like you for the best item in this department. And the chance that it will be you is now running about one in ten.

Also $5 to $15 (sometimes even more) is paid for each contributed item used. So a few minutes time may net you as high as $65.

Just send us the facts about your idea and its application. And include a free-hand sketch or snapshot to illustrate it.

We'll do the finished writing and drawing for you. Send it today, before you forget. Address it to Practical Ideas, Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors.

JANUARY PRACTICAL IDEA WINNER was "Protects Drive From Overload," sent in by Peter Chapman, Buckfield, Me. (Winners are chosen by Readex, a foremost outside survey agency that regularly polls many scores of FE readers throughout the country.)

"Worthington compressor

MOST EFFICIENT I'VE SEEN"

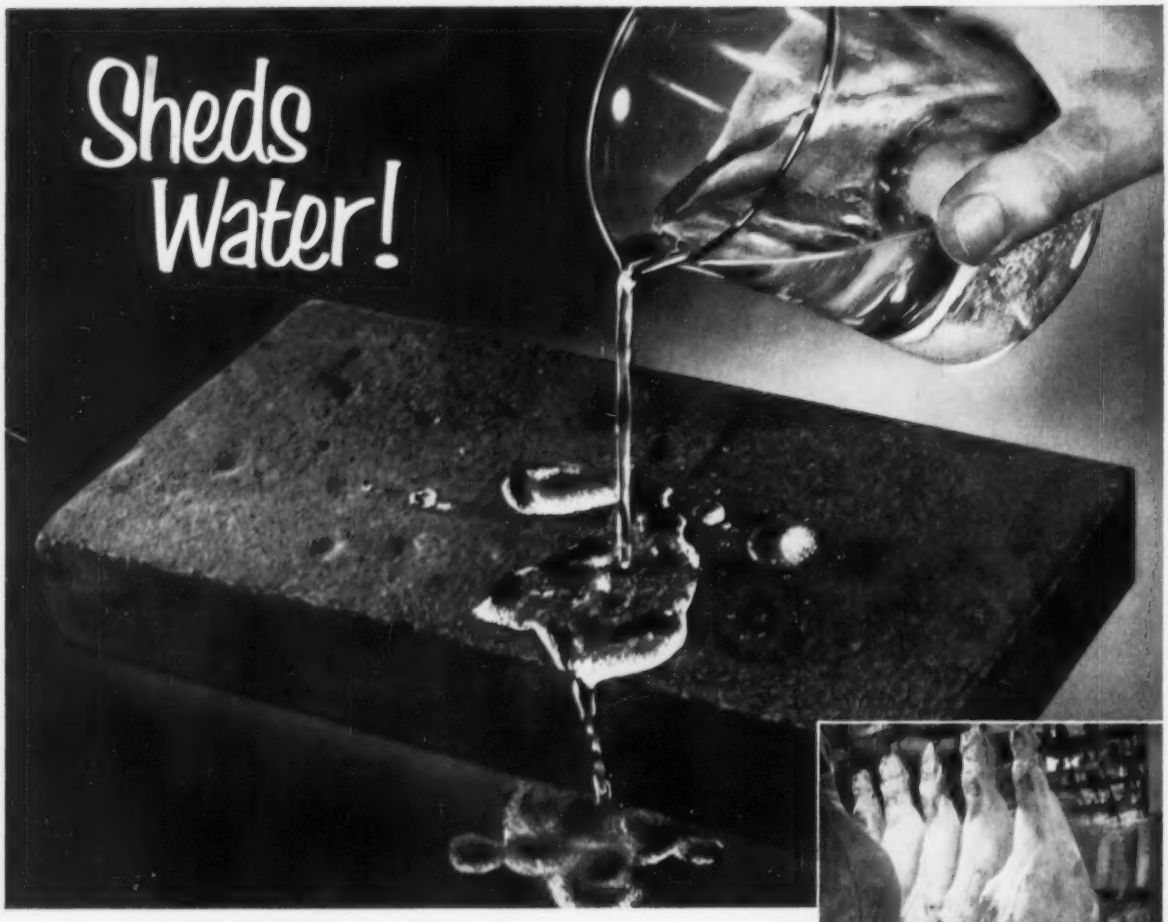
Executives of Grimes and Hauer Poultry Processing Corporation, in Fredericksburg, Pa., base their decision to purchase refrigeration equipment on three factors: (1) dealer dependability; (2) product performance; (3) compact design and construction of equipment.

Only Worthington equipment meets these requirements so well. The "Worthington compressors" in our plant says Walter Grimes, "have operated more efficiently than any I have ever seen." And, he adds, the service supplied by the Worthington dealer — Bohrer-Reagan Corp. of Reading, Pa. — has been uniformly excellent.

Mr. Grimes is shown with dealer Ben Bohrer discussing operation of the Worthington ammonia compressor. This unit supplies refrigeration for cold storage of up to 150 tons of poultry at −5°F. A second Worthington two-stage, 50 hp compressor creates a −35°F temperature to quick freeze up to 17 tons of processed poultry a day.

Worthington offers a complete line of refrigeration compressors. For information, contact your nearest Worthington dealer. Or write: Worthington Corporation, Dept. A7.50, Harrison, New Jersey.

WORTHINGTON



Ideal for cold rooms. Rock Cork will not contaminate delicate foods. It can't decay, is immune to mold growth, won't harbor bacteria and repels insects and vermin.

This Rock Cork advantage means lasting thermal effectiveness—*lower operating costs!*

If an insulation absorbs cold-room moisture and condensation, its thermal efficiency is quickly reduced—and operating costs are increased substantially!

Moisture resistance is, therefore, one of Rock Cork's major advantages!

Tests prove that Rock Cork absorbs less than 1% moisture by volume, even after prolonged exposure to air at 95% relative humidity. That's why Rock Cork maintains its low thermal conductivity in cold-room atmospheres . . . why its effective service life is measured, not in years, but in decades.

Developed at the world-famous Johns-Manville research laboratory, Rock Cork also offers unsurpassed resistance to fire, low conductivity for precise temperature control, ease and speed of installation. Rock Cork is also inherently odorless. It will not absorb or transmit the strongest odors, nor contaminate the most delicate foods.

Rock Cork is available in sheets and pipe insulation in standard sizes and thicknesses. For complete information on this new development in refrigeration insulation, write to Johns-Manville, Box 14, N.Y. 16, N.Y. In Canada: Port Credit, Ont.

Proved in flame! New J-M Rock Cork passes with the highest—"incombustible"—rating, the exacting Columbia Fire Test of the National Bureau of Standards' CS131-46. In test, a gas flame impinges directly on the material for 40 minutes. Temperature of flame reaches 1300F in eleven minutes, and 1700F in thirty minutes. Material must not flame during test—nor flame or smolder after gas is shut off.

Johns-Manville
incombustible
ROCK CORK INSULATION

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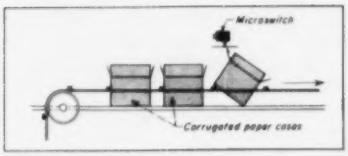
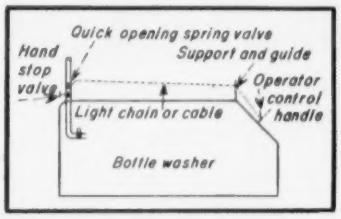
Practical Ideas



Control Prevents Case Damage

We have a drag type conveyor which feeds corrugated cases to the closing and sealing machine. On occasions, one edge of the bottom of a case dropped on one of the crossbars of the drag conveyor instead of between the bars, a jam up resulted at the closing machine resulting in damage to cases, and a delay in production.

To correct this situation, we installed a snap-action Microswitch above the drag conveyor. Its height was enough to clear cases riding properly on the conveyor, but not enough to be tripped by a case resting upended on one of the cross bars. Tripping the switch shuts down the case sealing line—at the same time sounds an alarm to summon a service man to properly align the case and then restart the line.—*George R. Pyle, Engineer, Morton Salt Co., Grand Saline, Tex.*



Handy Steam Saver

Steam waste and overheating of soak tanks of bottle washers can result from failure of the operator to shut off the steam valve during temporary shut-downs of the unit.

Making this chore easier by means of a remote steam valve control (see sketch) can solve the problem.

In this system the operator controls the steam by means of a quick opening spring loaded valve, which can be actuated by means of a light chain or cable running to his work area.

A more elaborate hookup could be provided using an electric solenoid valve. And water lines could also be controlled.—*"Cherry-Burrell Circle", Cherry-Burrell Corp., Chicago.*

SIFTING?

...do it better, faster, at greater profit with

DAY

ro-ball sifters

Choosing from the long line of standard Day Ro-ball Sifters offers many advantages, including: six different sizes—one to four screens (single screen units carried in stock)—two to five separations—gyrating action—super active ball cleaning—rugged heavy duty construction.

If your production requires sifting, you'll want a Day Ro-ball Sifter data sheet, listing all dimensions and specifications. Write today.

PLASTICS
FEEDS
CHEMICALS
FOODS
COSMETICS
MILK
DETERGENTS

NEW
DAY Ro-ball Sanitary Sifter, just added to our line of sifters, is designed to meet all requirements of the Dairy Institute Code for Grade A Products.

The **J. H. DAY** *Co.*

Division of the Cleveland Automatic Machine Company

SERVING THE PROCESS INDUSTRY SINCE 1887

4924 BEECH STREET, CINCINNATI 12, OHIO

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THE MULTI-MILLION DOLLAR QUESTION . . .

Ask SARGENT

Whether this all-important question is settled in Sargent's Laboratory or in your own, Sargent Dryers for food processing are guaranteed to deliver the product dried accurately, carefully, to the exact degree of moisture content desired.

For rice, cocoa, coffee, cranberries, nuts, fruits, cereals, berries, vegetables and other food products — even bird seed! — and wherever natural flavor, color, form and quality are a must, Sargent Dryers and Sargent Coolers are best for the job.

They are unusually rugged and dependable. Designed for easiest cleaning, for economical maintenance and operation — there are no hidden or hard-to-reach areas in Sargent Dryers! Built in any length, width, capacity. Economical of space, stainless steel throughout as required, performance-proven and guaranteed, every Sargent Dryer and Cooler is designed for your particular product, your process, your production.

Want more information? Just call your nearest representative or write us direct.

C. G. SARGENT'S SONS CORPORATION

Graniteville, SINCE 1852 Massachusetts

Drying and Cooling Machinery for all Process Industries

PHILADELPHIA 19 — F. E. Wasson, 519 Murdock Road
CINCINNATI 15 — A. L. Merrifield, 730 Brooks Avenue
CHARLOTTE, N.C. — W. S. Anderson, Carolina Specialty Co.
ATLANTA, GA. — J. R. Angel, Mortgage Guarantee Building
TORONTO 1, CAN. — Hugh Williams & Co., 27 Wellington St. East

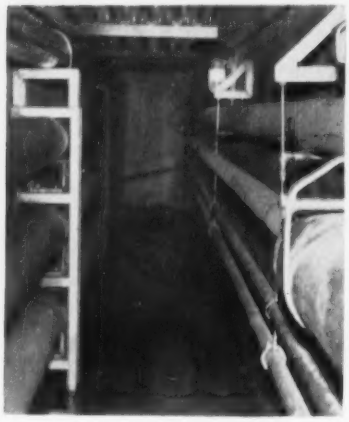
Practical Ideas

Oil Layer Aids Liquid Storage

Stored juices and wines, when preserved with SO_2, often produce acid vapors that attack metal at the air-liquid interface in stainless steel storage tanks.

To prevent this, we have added 0.5% of light viscosity liquid medicinal paraffin. By doing so oxidation and combination of free sulphite are stopped.

Heating the oil facilitates and ensures an even spread. Oil may be recovered and re-used. Inlet and take-off pipes should enter the tank below the oil level.—*C. S. Priest, Factory Manager, Cascades Cordials Pty. Ltd., Hobart, Tasmania, Australia.*



Pipes, Conduits Run Through Tunnel

Getting water, fuel oil, and electricity into the H. W. Lay & Co., Inc. plant at Chamblee, Ga. called for a tunnel (photo) under a railroad siding.

Built of concrete, the shaft is 36 ft. 9 in. long, 7 ft. high, and 5 ft. wide. Wall and ceiling hangers support pipes and conduits, and lighting is provided. This set-up simplifies inspection and maintenance work.

Access to the tunnel is through the boiler room.—*FE Staff*

Saving Office Time, Space

Microfilming of all checks is saving Forrest Poultry Co., Chicago two hours a day by eliminating time formerly needed to hand-enter 175 checks in the check register each day. Previously, clerks had to note

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almost every packaged poultry product . . .

has more glittering display value . . .

greater heat-and-serve consumer convenience . . .

when it's in a proven-by-sales package by . . .

The Plus Container

EKCO-ALCOA CONTAINERS *Inc.*
Wheeling, Illinois

EKCO is the registered trademark of Ekco Products Company. ALCOA is the registered trademark of Aluminum Company of America. The corporate name and combination mark, EKCO-ALCOA, is used under license to the manufacturer by each of these companies.

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Simple Arithmetic...
Type 302, Sheet Base Price 50.00 cents per lb.
Type 430, Sheet Base Price - 39.25 cents per lb.
Saving 10.75 cents per lb.
in Stainless SHEET Costs!

Now you can SAVE $215 per ton in base price alone!

Many designers and fabricators who are currently using Type 302 stainless can, in numerous applications, specify Type 430 straight chromium stainless and take advantage of the 10¾ cents per pound difference in base price. Some of our customers are already saving more than $215 per ton using our 430 MicroRold stainless sheet.

The steel industry estimates that 50% of all stainless sheet applications could satisfactorily employ Type 430, the least expensive of all stainless grades, as an economical and practical material. When properly applied, Type 430 has all the desirable qualities of beauty, corrosion resistance, strength, long life and low maintenance that no other material, except stainless, can offer.

We are currently producing our MicroRold Type 430 sheets up to 48" wide in thicknesses .005" to .109" with 2B or 2D finishes; and in thicknesses .010" to .109" in No. 3, 4 and 7 finishes.

Send for Your copy, "Care and Use of 430 MicroRold Stainless Steel"

Washington Steel *Corporation*

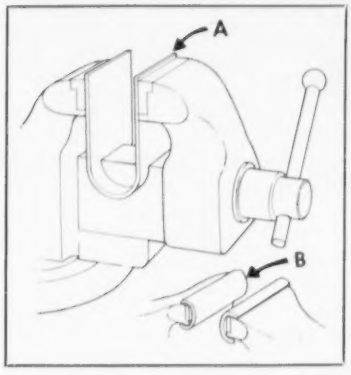
4-W WOODLAND AVENUE, WASHINGTON, PA.

amount, payer, payee, date, and bank number. During holiday seasons when check traffic jumped to 300 a day, entering them all by hand in the same day was impossible.

Now checks are simply listed on an adding machine and run through a Recordak microfilmer, along with the tape. Deposit slips, with check total and the checks, are then forwarded to the bank.

Microfilming provides protection against loss in transit, and depositing checks the day received speeds up availability of funds. Checks received later in the day are microfilmed and mailed for deposit first thing next morning.

The company is also microfilming records as protection against fire loss, and to save filing cabinet and floor space. Plans are under way to microfilm accounts receivable to streamline bookkeeping and realize lower premiums on accounts receivable insurance.—*FE Staff*



Temporary Soft-Vise Clamp

The occasion often arises when the hard gripping jaws of shop vises need some soft packing to protect delicate work that is to be gripped.

And since it is not unusual for the resultant soft clamp to be used for most of the subsequent vise work, it is worthwhile to make up soft packings that will stay in position.

Ordinary pieces of sheet copper or brass, bent to an L-shape, will never stay in position on the jaws, and so require constant readjustment. Hence, the development of the following methods for providing easily removable soft-vise clamps that do stay in place when in use.

One highly successful soft clamp that will grip delicate work without marking it is made from a single rectangular piece of some soft mate-

Win the Race
OF PRODUCTION TECHNOLOGY

STERLING SPEED-TROL VARIABLE SPEED MOTORS

STERLING SLO-SPEED GEAR MOTORS

STERLING CONSTANT NORMAL SPEED MOTORS

STERLING MULTI-MOUNT SPEED REDUCERS

Sterling Electric
POWER DRIVES

Electric Power Drive Systems are important factors in determining the productivity and flexibility of any manufacturing process. To help you successfully compete with the trend toward mechanization and automation, Sterling offers a wide range of power transmission equipment—variable speed or constant speed—with manual or automatic controls. These products, plus Sterling's Application Engineering Service, give your machinery the type of drive system that assures versatility and maximum productivity at lowest cost.

Write today for Bulletin No. 185. Discover the big advantages Sterling Electric Power Drives can bring to your plant.

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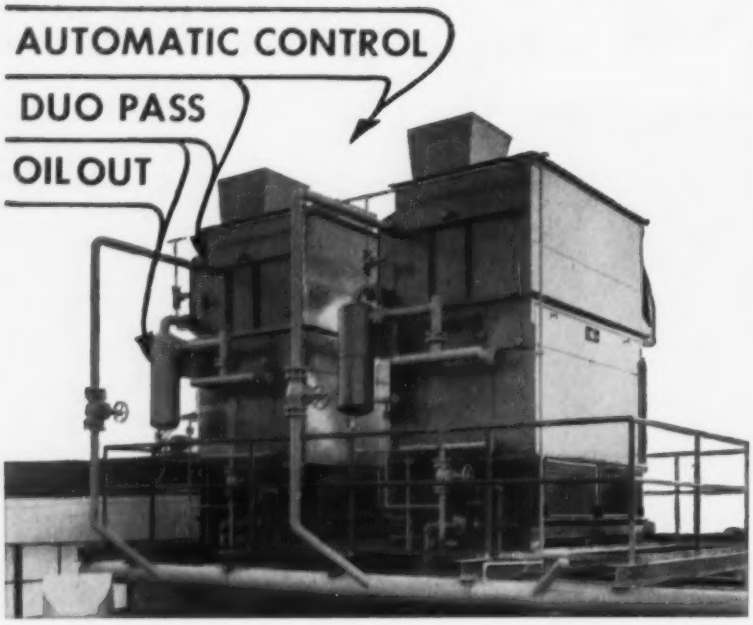


SAVE HALF THE ENGINEER'S TROUBLES ...WITH A REFRIGERATION PLANT

Hundreds of engineers have been interviewed about their experience with the Niagara Aeropass Condenser. In one way or another, they say, "I wouldn't go back to anything else." And their managers, who watch the costs, say, "Best investment we ever made, couldn't operate now, without it."

Niagara Aeropass Condensers have three exclusive features which save trouble and money in running a refrigeration plant:

"The Duo-Pass"— keeps scale and salts from crusting the coils, keeps the condenser always at full capacity.

The "Oilout"— removes oil and dirt from the refrigerant, at the exact point where the oil vapor is condensed and the refrigerant is not.

The "Balanced-Wet-Bulb" control gives automatic operation at the minimum head pressure, saving power cost the year 'round!

In addition, the Niagara Aeropass Condenser saves nearly all your cost of cooling water, quickly bringing back to you the cost of installation. In plants where refrigeration is a production process, owners know that this condenser has reduced their costs.

Write for Bulletin 111; Address Dept. FI-4

You can see one of these installations near you.

NIAGARA BLOWER COMPANY

405 Lexington Ave. New York 17, N. Y.

District Engineers in Principal Cities of United States and Canada

Practical Ideas

rial—(A) in sketch—with a rectangular hole cut in the center of it.

When this piece of material is bent to a U-shape, the rectangular hole fits easily on the square ram, while the extremities of the piece cover the hard gripping surface of the vise jaws. The hole in the center is cut to suit the width of the square ram, and the exterior dimensions are the width of the vise jaws.

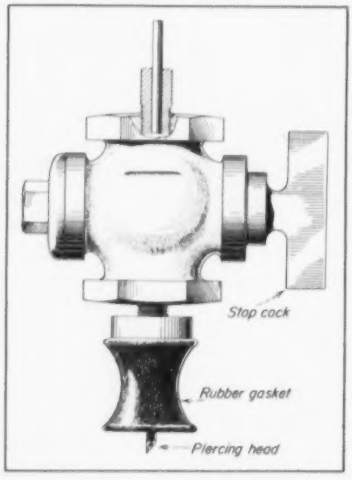
With this arrangement, the vise can be readily opened or closed. A single piece of material will effectively cover the hardened gripping pads at most settings.

Materials which are suitable here are hard fiber, rubber, old leather belting, and even thick cardboard or stencil stock. Cardboard has proved adequate for holding parts that are plated or highly finished.

Another form (*B*) of soft clamp for gripping highly finished pieces that are also fairly soft is ordinary rubber hose.

Two pieces are cut off to the same length as the vise jaws, and each piece is slit lengthwise. The slit of each is then opened and the pieces are pushed over the vise jaws.

This type clamp is more applicable to the fairly small bench vises, the jaws of which are more suitable for the fitting of rubber hose—*Clifford T. Bower, Tool Engineer, London, England.*

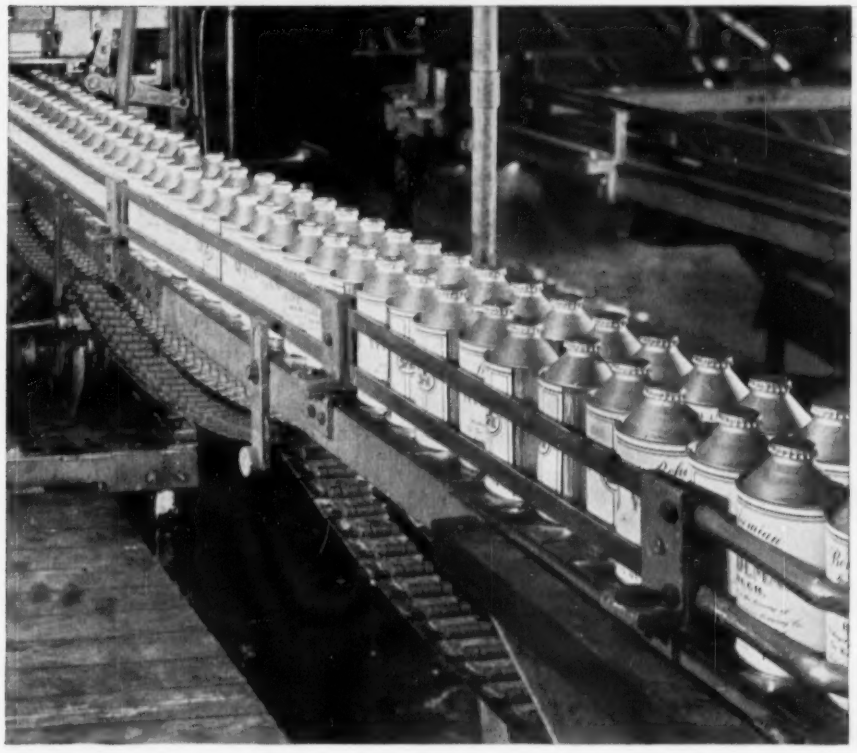


Testing Can Headspace Gas

Sure and safe testing of headspace gas in spoiled cans can be done with our new device.

A can of food with bulged ends indicates spoilage. The swelling is generally caused by either (1) the

Link-Belt S-815 flat-top chain improves food container handling



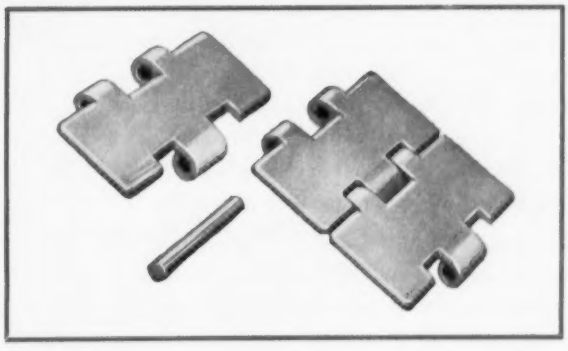
Offers conveying flexibility—simplifies assembly, maintenance

Link-Belt S-815 flat-top chain presents a safe, smooth conveyor path for handling food and beverage bottles, cans and similar containers through washing, filling, capping and other operations. Designed to simplify conveying in bottling plants, canneries and dairies, S-815 chain is readily adaptable to new or existing machines.

One-piece links are formed from steel strips and connected by steel pins. Top edges of links are beveled to permit free movement of containers across the surface. Pins can be quickly removed for easy maintenance and chain adjustment.

Available in five widths—in carbon or stainless steel. And its simple design eliminates dirt-catching pockets and crevices—an important feature where sanitation is essential.

LOW-COST S-815 flat-top chain conveys cans of beer from filling and capping machine. Smooth, unbroken carrying surface of chain reduces danger of tipping.



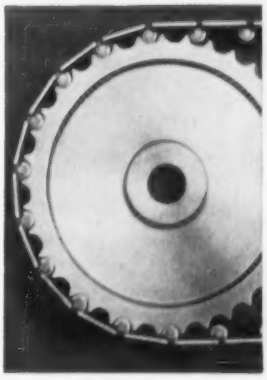
One-piece S-815 link serves as integral carrying platform

One-piece links, with beveled edges, dovetail with adjacent links to form a smooth, continuous carrying surface. Elimination of the straight-line lateral gap between links removes the danger of tipping or jamming stalled containers, permits chain to slide freely under them. Chain can be detached at any convenient pitch by merely removing the connecting pin. Ask for Folder 2344.

Unique design of S-815 sprockets doubles life

Specially designed cut-tooth sprockets for Link-Belt S-815 flat-top chain provides twice the necessary number of teeth, doubling wheel service life. This design refinement insures close control of tooth profile and dimensional specifications, resulting in proper chain engagement . . . minimum wear . . . quiet, smooth operation.

In operation, links contact every other tooth. Odd number of teeth in sprocket automatically distributes wear. However, similar service can be obtained with even number of teeth by periodically indexing the sprocket one tooth.



HEADQUARTERS for chains, sprockets and other Link-Belt conveying and mechanical power transmission products is your nearby Link-Belt factory branch store or authorized stock-carrying distributor.

LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.285

In the mind of the consumer brilliant clarity, for many food products, is inseparably linked with high quality... the point is so well established as to need no discussion. To gain this sparkling clarity, which may require the removal of unwanted solids even down in the colloidal and bacterial size range, Dicalite Filteraids have no superior ... a fact established in many impartial laboratory tests and in the daily experience of leading producers in the food, sugar and beverage fields.

Since there are 8 Dicalite Filteraids, differing in particle size and range, practically any liquid can be filtered to desired clarity at economically fast flowrates. Since Dicalite is processed from highest-grade diatomite, it is both physically and chemically stable... it is sterilized in processing, and cannot affect characteristic flavor or aroma.

Brilliant clarity—stability of finished product—lowest filtration cost ...these are the reasons why many processors have selected Dicalite Filteraids for all their processing.

Write for Information.

Dependable GLC GREAT LAKES **Dicalite®** DIATOMACEOUS MATERIALS

Dicalite Division, Great Lakes Carbon Corp., 612 S. Flower St., Los Angeles 17, Calif.

formation of carbon dioxide gas produced by growing micro-organisms, or (2) the formation of hydrogen gas as a by-product of container corrosion.

A very old, but simple, test to determine whether the headspace gas in the can is carbon dioxide or hydrogen consists of piercing the can and allowing the gas to escape while a lighted match is held near the opening. Hydrogen gas will ignite, but carbon dioxide gas will not. When the can is pierced, however, hydrogen gas may escape fast enough to blow out the match giving an erroneous test result. Or it may produce a flame big enough to burn the hands of the operator. Hence, we developed a piercing device that permits the operator to control and regulate the escape of the headspace gas.

It consists of a hollow tube piercing head provided with a soft rubber gasket such as is used in can vacuum gages. The piercing head is attached to an ordinary stopcock that leads to a pipe about four inches long.

To operate this device, the stopcock is closed and the can is perforated with the piercing head. The soft rubber gasket surrounding the hollow tube makes a contact with the tinplate that prevents any gas from escaping. The gas can then be released slowly by gradually opening the stopcock. A lighted match is held at the end of the pipe to test safely whether the gas can be ignited. —*G. Kohn, Research and Technical Department, American Can Company, Newark, N. J.*

Simple Container Washer

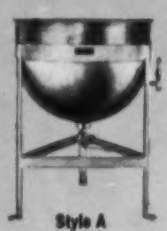
When products to be frozen are filled into paperboard containers with metal ends, some spillage occurs. And any of the material that adheres to the outside of the con-

LEE

Corrosion-Resistant

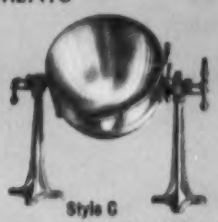
PROCESSING EQUIPMENT

PRECISION BUILT OF STAINLESS STEEL
TO YOUR SPECIFIC REQUIREMENTS



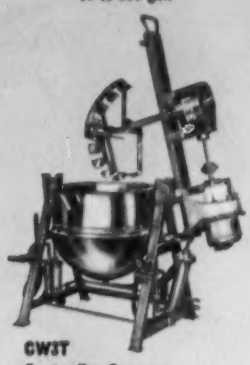
Style A
Two-thirds Jacketed
5 to 500 gal.

Style B
Full Jacketed
10 to 300 gal.

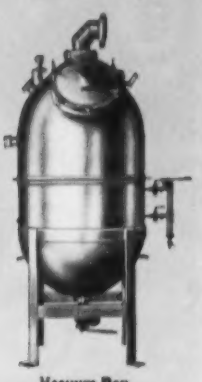


Style C
Two-thirds Jacketed
5 to 100 gal.

Pressure Kettle
Two-thirds Jacketed
40 to 200 gal.



CW3T
Center-line Scraper
Agitator Kettle—80 to 300 gal.



Vacuum Pan
50 to 500 gal.

Style CW
Two-thirds Jacketed
80 to 300 gal.

Pulp Tank
500 to 2,000 gal.

Storage Tank
100 to 5,000 gal.

Quick Cooling Pan
50 to 200 gal.

LEE

Technical bulletins fully describing these processing units gladly sent on request.

METAL PRODUCTS CO., INC.

416 PINE STREET, PHILIPSBURG, PA.

Designers and Manufacturers of
Corrosion-Resistant Processing Equipment
for over 25 years.

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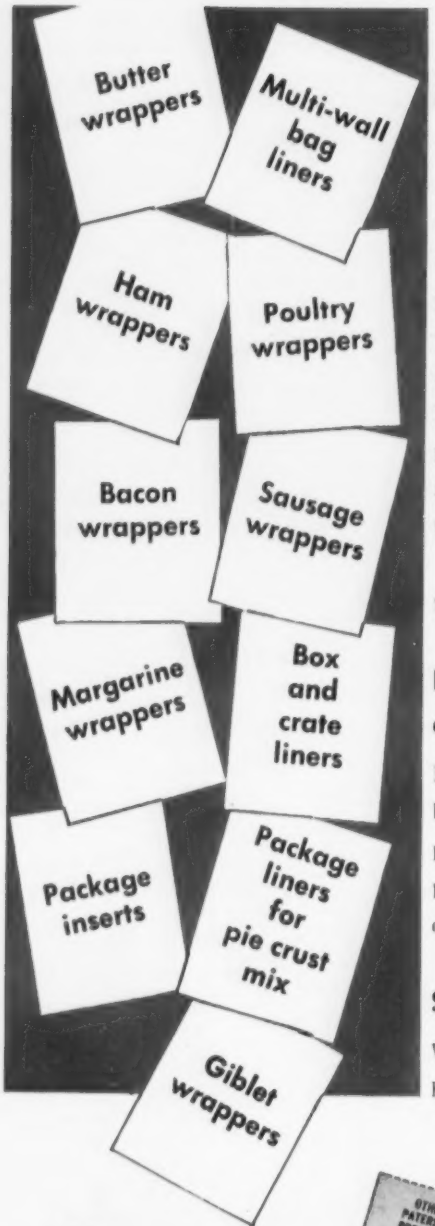
If you package foods, Patapar® can be good news for you!



Available in many different types, Patapar Vegetable Parchment offers unique qualities as a packaging material. It has high wet-strength plus high resistance to grease, fats and oils. Made from pure cellulose, Patapar is odorless and completely non-toxic. It handles easily on all types of packaging equipment.

It meets every requirement of the Federal Food and Drug Act.

Furnished plain or exquisitely printed

Patapar comes to you plain or beautifully printed by letterpress or lithography. We will reproduce your present design or create a colorful new one for you.

Send for samples

Write us on your company letterhead, telling your requirements.

Patapar®
Vegetable Parchment
HI-WET-STRENGTH • GREASE-RESISTING

OTHER PATERSON PRODUCTS
*PATAX waxed paper
*DURAPAK parchmentized cellulose
*PATERSON absorbent paper
*PARCHRIN art parchment

PATERSON PARCHMENT PAPER COMPANY
Bristol, Pennsylvania
Sales Offices: New York, Chicago
West Coast Plant: Sunnyvale, California

HEADQUARTERS FOR VEGETABLE PARCHMENT SINCE 1885

Practical Ideas

tainers creates an unsightly appearance. When packed into shipping cases prior to freezing, such containers also contaminate the shippers.

Simple solution is to fabricate a spray-type washer to clean products from outside of containers (see photo).

Washer consists of a double angle-iron track (2 ft. long), set at about a 30-deg. angle and wide enough for containers to slide along as they are discharged from the volumetric filling and lid-closing machines. Mounted about 10 in. above the tracks are two 2x24-in. perforated water pipes. Both tracks and spray pipes are enclosed in a 10x12x24-in. housing constructed from a sheet of galvanized iron.

In turn, washer is secured to one end of a 75-gal. stainless steel vat. This vat is mounted about 1 ft. above the floor on 2x4 wooden frames. Water from vat drains into a sewer line through a 2-in. pipe—*FE Staff.*

Neoprene Protective Coating

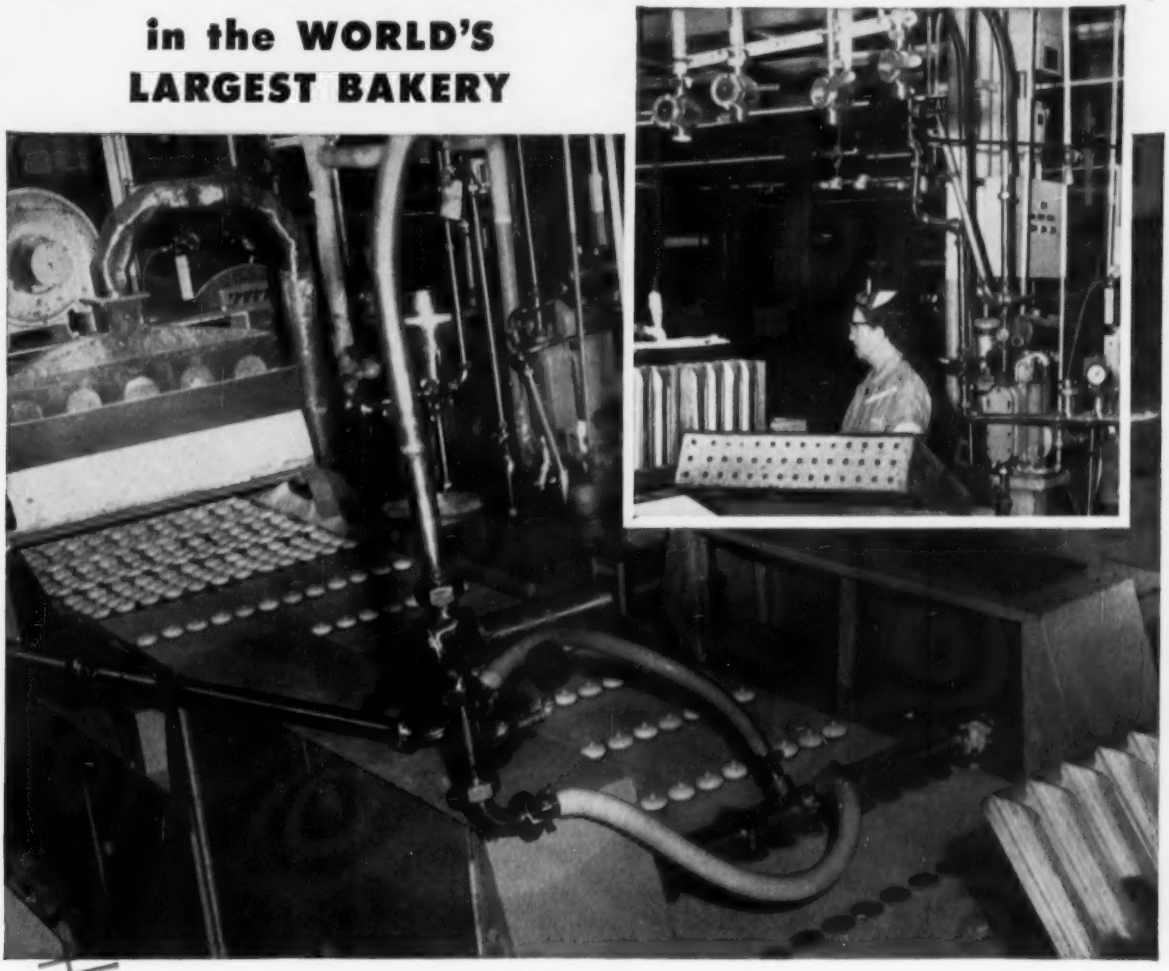
Many spots around cars and trucks need frequent attention due to rust and corrosion. Road salt continually peppering the undercarriage can cause brackets to rattle, exhaust pipes to wear thin, and battery frames to corrode—to name a few.

A new product called liquid neoprene may be just the ticket for quick, effective maintenance (see photo). Not a paint, this product is actually almost pure liquid rubber, and is claimed to be unaffected by sustained temperatues from 200 to −35F.

It is simply applied by brush on any clean surface, and is elastic enough to give and take with the spring action of the body. Successive layers may be applied for thickness by waiting 30 min. between coats. The coating is resistant to oil and gasoline. — *"Neoprene Notebook," E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.*

TRI-CLOVER FITTINGS Protect Product Quality

in the WORLD'S LARGEST BAKERY



NABISCO

NATIONAL BISCUIT COMPANY'S New Chicago Bakery is the largest biscuit and cracker bakery in the world. This modern, efficient plant utilizes rigid laboratory controls and elaborate sanitary measures to guarantee products of the highest quality.

Helping NABISCO to achieve these outstanding results are scores of Tri-Clover Division's sparkling clean stainless steel sanitary fittings, valves and tubing, used in numerous cookie and cracker baking and processing operations. For here, as elsewhere throughout the food processing industries, users have found that there is no substitute for the high quality and complete sanitation inherent in Tri-Clover products.

Let our engineering staff help you achieve new standards of efficiency and sanitation.

Call or write for further information.

• *Top view shows a few of the Tri-Clover valves and other fittings used in handling various cookie fillings and coatings.*

• *The large view shows a close-up of part of the Tri-Clover sanitary valves and fittings used to feed marshmallow topping used on Nabisco's well known "Fancy Crest" cookies.*

LADISH CO.
Tri-Clover Division
Kenosha Wisconsin

See your nearest TRI-CLOVER Distributor

TRI-CLOVER

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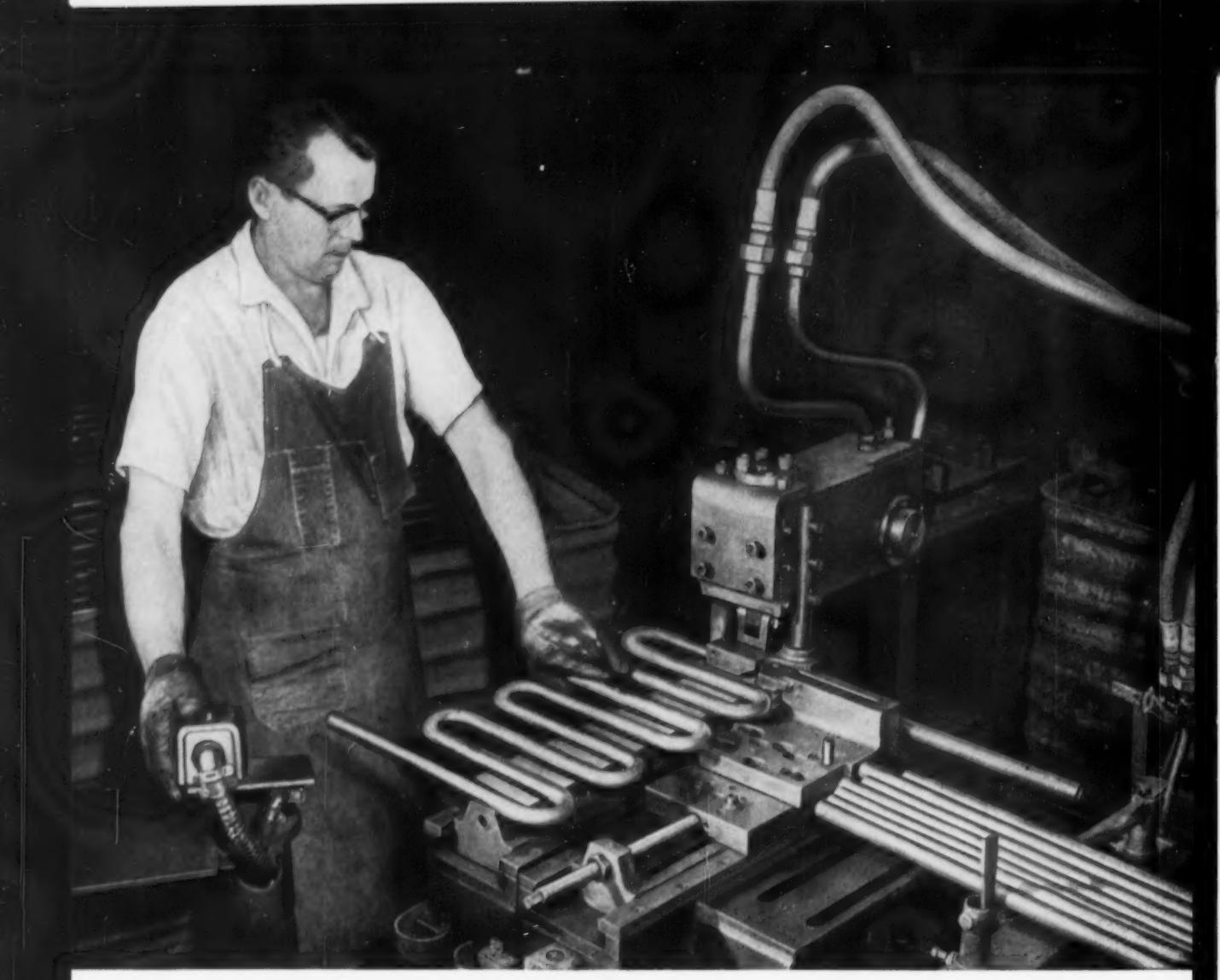


A REFRIGERATOR, TOO, CAN BE THE STRONG, SILENT TYPE

One home refrigerator with a reputation for silence and long service life depends upon B&W for "the type of tubing necessary to the efficient operation of the refrigerator. Without it, the refrigerator could not provide the required performance. It must last the life of the unit."

To meet that tough specification for evaporator coils and high temperature coils, B&W supplies Electric-Resistance-Welded Tubing with precision-made serrations on the I.D. Rockwell hardness must be held within close tolerances, and the seam-weld must withstand 1,000 pounds pressure—no interior surface copper is permitted.

For special applications like this, get in touch with Mr. Tubes, whose specialty is matching tubes to jobs to save you time and money. For many Electric-Resistance-Welded tubing requirements, you'll find that your nearby B&W distributor maintains comprehensive stocks to meet your needs. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

Seamless and welded tubular products, seamless welding fittings and forged steel flanges in carbon, alloy and stainless steels

TA-6074-GP

Food Is Achilles Heel of National Defense

It curls your hair to consider the catastrophies that can come to food plants, products, supplies, and personnel through secret or open warfare with modern weapons.

And it makes one's hair stand on end to think of the vulnerability of our civilians and armed forces to attack through our Achilles heel—the food supply.

Fortunately, the problems have been investigated and recommendations made by a Civil Defense Foods Advisory Committee created by FDA. Roy C. Newton, vice-president of Swift & Co., and well-known food technologist, heads this committee.

Committee's Conclusions Disturbing

After a year of careful study, Dr. Newton's group came up with these disturbing conclusions as to the seriousness of the situation:

It would be possible to contaminate sufficient food to impair or endanger the lives of large numbers of people scattered over wide areas of the country.

Our industry is almost entirely unprepared to meet an open or secret attack by special weapons.

It does not appreciate the serious possibilities, or results, of under-cover attack involving bacterial or chemical warfare.

It has not studied the problems of radiological warfare.

Certain segments of the industry are extremely vulnerable to secret activity with biological or chemical agents, and possibly to the radiological.

Quality control as practiced today cannot afford protection.

New Training and Methods Required

Now Roy Newton is not one to pose problems without coming up with some answers. And his committee made a series of recommendations. Among them are these:

That the FDA provide specially trained personnel to help and encourage food trade associations and societies to establish local committees in metropolitan areas. These committees would study local needs and help to train management and technologists.

That an inexpensive radiological monitoring device be developed for use even in the smallest of food plants. Also that a reliable, but simple, procedure be worked out for detecting chemical agents.

That FDA apprise food management and technical personnel of the vulnerability of their operations, and provide training information.

These recommendations have not gone unheeded. The FDA scheduled the first civil defense training school for canners, to be held in Rochester, N. Y., March 26-28. And defense schools are to be conducted in more cities as soon as instructors are available.

Every food manufacturer, warehouser, and shipper should lay plans immediately to acquire information on civil defense and establish protective procedures.

Don't sluff off on the theory that the need is remote. Why do you think our military is developing so many Buck Rogers defense weapons? And remember that world domination remains a fundamental Communist doctrine.

Are You Replacing Hose Too Often?

POWERFLEX
Steam Hose

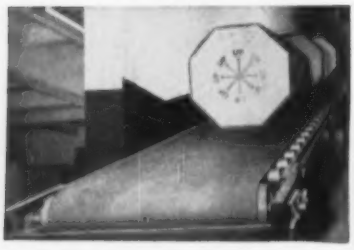
Better change to Thermoid as Bonner Packing Company did!

This California packer of raisins, figs and apricots was replacing steam hose on an average of every six months. Then they tried Thermoid Powerflex Wire Braid Steam Hose.

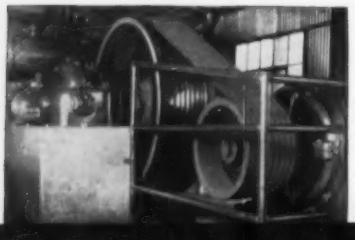
Thermoid engineers know the beating that steam gives hose. And they've designed Powerflex Wire Braid to take it! At Bonner Packing Company, this powerfully reinforced 1"x2 braid hose is still on the job after 18 months, with still no signs of need for replacement.

There's a Thermoid Hose built to give you longer service and maximum economy in your specific application. It will pay you to get in touch with your Thermoid Distributor, or write direct for his name and a copy of our latest Hose Catalog.

Cut costs with Thermoid Conveyor Belting...

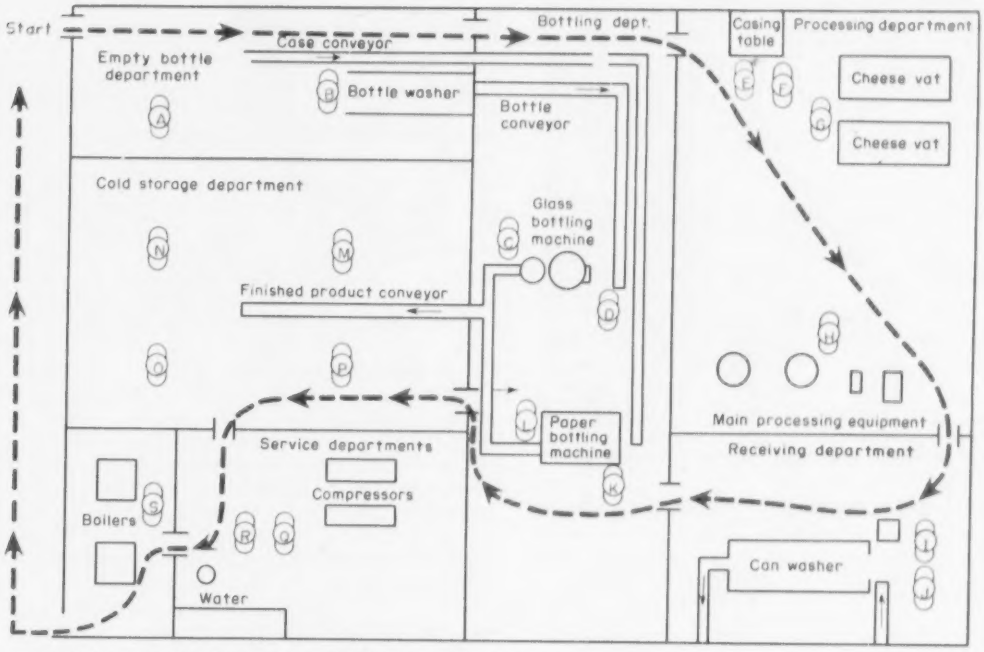


...and Thermoid Multi-V Belts



Thermoid

Thermoid Company, Trenton, N. J.



1 FOR A "WORKING BLUEPRINT," you sketch-chart your plant, indicating employees (circled letters) and major equipment. This is authors' layout of dairy (study described in this article). Dash-line shows path followed by person making the labor-performance observations.

Fast and Simple Sampling Method For Checking Labor Performance

Easy "random" observations—no stopwatch needed—give you key data on "working" and "idle" time . . . System is also handy for studying numerous time factors on production equipment

CHARLES E. FRENCH
Associate Professor, Agricultural Economics Department, Purdue University, Lafayette, Ind.

"WE WANT TO CUT our labor costs. So make a time-study of our operations and tell us why our labor bills are out of line."

This—more often than not—is one of the prime assignments dealt out to the new young junior executive.

But usually the results are most disappointing.

The young man generally fails this assignment because he doesn't know how or where to start. More pathetic yet, he may tear into the problem with a stopwatch and lose himself in a wilderness of detail.

All that comes out of such abortive attempts at labor savings are black eyes for labor-efficiency studies, bad cases of personnel problems, and unwarranted black mark on the records of potentially good junior executives.

And why haven't such labor-cost studies been made before? Well, the most common reason is that the persons making the assignments likewise haven't known where to get their teeth into such a big problem.

Getting Off 'Dead Center'

Our purpose is this article is to illustrate a technique for getting either the manager or junior off dead center so that they can tackle this very important management question efficiently.

When a manager starts this specific ball rolling, he's usually visualizing a report showing how each worker uses his time, and especially how much of it he wastes. At least, this is the kind of report that would please

Department	Worker	Times Working			Times Idle			Total
		Observation	No.	Percent	Observation	No.	Percent	No.
Empty bottle	A							
	B							
	Department total:							
Bottling	C							
	D							
	L							
	K							
	Department total:							
Processing	E							
	F							
	G							
	H							
	Department total:							
Receiving	I							
	J							
Cold storage	Department total:							
	M							
	N							
	O							
	P							
	Department total:							
Service	Q							
	R							
	S							
	Department total:							
PLANT TOTAL								

2 **NEXT MAKE A FORM-SHEET** for handy recording of your observations. This one for the dairy plant is marked with tallies on 19 workers in 6 departments. Note that spaces are provided for time-percentage figures and totals.

almost any manager requesting a check on labor costs. However, this type of study isn't easy to make.

Traditionally, such a project has called for the use of one of two methods:

The conventional time-study, in which each piece of work is checked with a stopwatch, will provide this type of report if properly carried out. Yet this kind of time-study should yield much more.

Unfortunately, it costs dearly and demands specially trained technicians, whereas our manager quoted at the start of this article had no intention of giving his poor victim, the new junior, either this kind of money or technical aid.

The gross time or production study is the other method. Here, a continuous record is made on each man for a period of time, usually with a common wrist watch. And with proper techniques this procedure will give what we want, and usually more. Again, however, the cost is high. Also, it takes considerable ingenuity and finesse on the part of the new employee to set it up properly and win employee acceptance.

The ratio-delay study,* however, is the system we are advancing here. Already proved out in dairy plants and fruit packing houses (as well as in a number of other industries and also military operations), it has gained popularity because it is relatively cheap, quick, accurate, understandable, and fairly simple to do.

Basis is this simple idea in statistics: If a working man is observed at random, the *number of observations* falling in various work classifications will be in proportion to the *amount of time expended* on each of these work classifications.

Here, the statistician is merely saying that if we make 100 random spotchecks on Worker (A), and find that on 61 of these checks work is being done, then we can assume that this man is busy 61% of the time. Or in other words, 37 min. of work are being accomplished for each 60 min. of time paid for.

* Initially developed in English textile mills.

What Are the Advantages?

Of course, the big advantage comes from the fact that we are using a *sample*, and thus saving money. It's stated that the ratio-delay studies generally cost from 33 to 80% less than the traditional studies mentioned. Our experience in milk plants tends to bear this out. And as we learn to use R-D better, it seems logical that we will eventually do the checks at half the cost of current time or production studies.

R-D doesn't require a stopwatch and needs no time-study man. Any wide-awake plant man can handle it, since it's straightforward and simple. These studies will not influence workers either to "slow up" or "make work" and so render the results erroneous. Proper techniques avoid this. With no stopwatch, the observer is much better received by the workers. We hasten to add, however, that workers should know what the study involves and why it is being made.

The method can give more accurate data on many problems. Reliability and accuracy can be checked with statistical control. Moreover, the studies will do a better job than the production study in measuring pieces of work or delays that occur frequently but for only short periods.

How Do You Do It?

Now let us run through a specific dairy-plant problem, as illustrated by the accompanying chart showing a plant, its equipment, and the employee locations. It is assumed that we want to learn the percentage of working and idle time for each man in each department.

First, let us take the general steps in the procedure and tie them in.

1) Determine your objective. Research experience has now taught us that this, more often than not, is over half of the problem solution, whereas we'd initially considered it merely a cliche.

Your objective may simply be to measure the labor use of several departments where men are continually shifting from one to the other. Or you may want to know what percentage of the time a crew is working or not working.

We are emphasizing labor in this study, but you can also use this means to get down-time on machines, routes of materials handling equipment, percentage of time a piece of equipment is used, and dozens of other production-efficiency factors.

First off, then, know your objective. (We've already stated ours for this present illustration: To determine working and idle time for each man.)

2) Advise all workers and supervisors who are likely to be affected. This move comes early for the obvious good reason of smoothing the project.

3) Have a summary job description of what's done at each work station.

The man who's handling this check need not be an expert time-study man, but he must know what is going on in the plant. This can't be overemphasized. So in this illustration let us assume we know exactly what each man in each department does. For example, we know what to expect if, when checking the empty

bottle department, we find, say, that Worker (A) is absent.

4) **Draw a schematic plant layout** (such as illustrated) to locate the work stations involved. This assures that the man making the study can "put all of the pieces together." Also, this layout serves as a blueprint upon which to sketch your system for spot-checking the departments. This must be done carefully–a sample being no better than the methods used to draw the sample.

5) **Determine the exact points** at which each spot-check will be made. Here is why this is important: Assume you come into the bottling department and find Worker (C) idle, but that upon seeing you he starts casing bottles.

If you are sympathetic, you may be inclined to mark him as "working" rather than "idle." However, the statistician warns that this would ruin your study. Usually, the best way to handle this is to establish definite check points, then make split-second observations (much as you would with a camera lens) and record exactly what you see.

Door entrances, or the exact point at which you pass a given machine or post, serve as good check-points. For example, we would probably check Workers (A) and (B) the moment we entered the door to the empty bottle department (upper left hand corner of chart).

Then we might best check Workers (C) and (D) from the door between the empty bottle and the bottling departments. For checking Workers (L) and (K), however, we may want to wait until we enter the door between the bottling and cold storage departments. Just find logical check-points for each.

6) **Prepare a record-form** on which to jot your spot checks. The form illustrated here is one suitable for collecting our data. Note that it has columns for "working" and "idle" observations for each worker. Also, there is room to make the simple calculations to determine the percentage use made of time by each employee.

7) **Try the form.** Properly designed, your form will prove a big help in getting accurate observations. Give it trial runs prior to the time you start taking your actual observations. Revise it, as may be necessary, until you are sure it will work. Ours here was the final result for our study after we had made several trial runs and modifications.

8) **Take observations at random.** Your study is made by going through your plant along your marked route, taking an observation at each check-point. These observations should be well scattered over your work period to include all types of work situations typical of your operations. They can be randomized with statistical precision if need be.

Also, recent modifications of this technique are using "work sampling". This may involve taking a longer observation of, say, 1 min., and getting a breakdown of the work for this entire minute.

Keep this technique in mind. However, for our problem, let's assume we are merely making one observation at each check-point and putting a tally mark for each worker under either the "working" or "idle" column. For example, note that the tallies on our form indicate that we found Worker (A) to be working 6 times and idle 4 times.

9) **Check the accuracy of your observations.** This type of study is possible because we are able to sample. Use of this technique, however, requires certain definite precautions on the part of the man doing the sampling. We have tried to cover these responsibilities by our method outlined above.

Further, we want our sample to be large enough so we can be sure of ourselves. We have three approaches to this.

A simple and rather practical test is to chart your results–as shown in our graph illustration, which gives a curve on Worker (A)'s idle time, as observed.

After we had made 100 spot-checks on him, we calculated his percentage of idle time as 32%. Then at 200 observations, our estimate had gone up to 46%, and checks at the 300 and 400 observation level still showed our estimate to vary with number of observations.

However, after reaching 500 observations, the estimate of this worker's idle time held at approximately 40%. Thus, we had a fairly reliable estimate of it.

By making such charts for your workers you will get a good idea of whether or not your sample is large enough. Another approach is to use the following statistician's formula:

$$\text{Number of observ. necessary} = \frac{4\ (1 \text{ minus decimal estimate of percentage})}{\left(\frac{\text{Dec. percentage error allowed in percentage estimate}}{}\right)^2 \left(\text{Dec. estimate of percentage}\right)}$$

In our case, we might like to know the number of observations we need to assure us that our estimate of Worker (A)'s idle time is no more than 5% in error 95 times out 100. Then our formula would be:

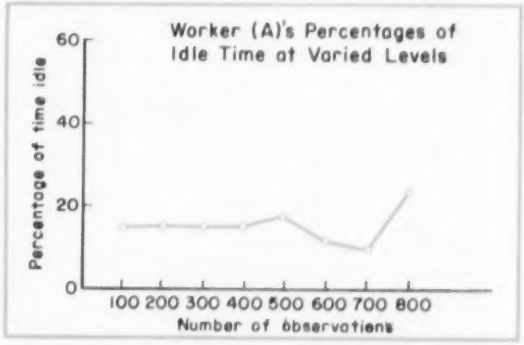
$$\text{Number observ. necessary} = \frac{4(1 - .40)}{(.05)^2\ (.40)} = 2{,}400$$

This may be more accuracy than needed, of course. If so, we can relax our requirements, and we will find that our "number of observations necessary" will be reduced accordingly.

Still another useful formula permits us to set accuracy ranges for our percentages:

$$\text{Standard error of percentage} = \sqrt{\frac{\left(\text{Dec. est. of percentage}\right)\left[1 - \left(\text{Dec. est. of percentage}\right)\right]}{\text{Number of observ. made}}}$$

(Turn to p. 242)



3 **FINALLY, SIMPLY-MADE GRAPHS** of workers' idle-time percentages give you a check on the accuracy of your observations. Note here that Worker (A)'s "scores" fluctuated somewhat during initial levels of study, but later held steady for a "solid" reading of 40%.

PROCESS STARTS with peeling of full-ripe bananas conveyed from ripening rooms. Fruit is placed on belt (top) that feeds them to pulper (not shown).

Selected fruit is brought to full-ripe stage under controlled temperature, then quickly processed and canned to hold original flavor and color

Advanced Techniques Give Year-Plus Freshness to

New Banana Puree

R. T. NORTHCUTT, JR. and ARTHUR V. GEMMILL
Plant Manager, Food Concentrates, Inc., Woodbridge, N. J.; and Senior Associate Editor, "Food Engineering"

SUCCESSFUL CANNING of bananas has long baffled processors because of the frustrating characteristics of the fruit.

But now a way has been devised of canning the pureed product that retains the delicate flavor, color and other characteristics of the fresh ripe fruit for more than a year at room temperature.

In the advanced technique, the puree is prepared from fully ripened fruit right in the tropical growing area. Then it is flash sterilized, quickly cooled, canned aseptically, and shipped to this country for distribution.

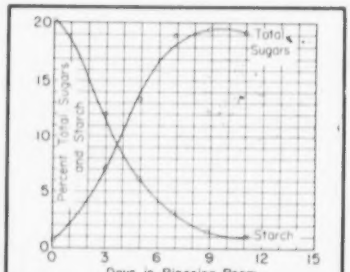
Primary users at present are baby food and ice cream manufacturers, hospitals, and institutions.

However, formulas are now being prepared for the baking field, where the product can be used in breads, icings, and fillings without darkening.

Previous troubles in canning the fruit had resulted from the fact that bananas falls into the general class referred to as non-acids foods, which require a higher degree of sterilization than such acid foods as apples and peaches.

And bananas have a delicate flavor and color that is extremely sensitive to heat. So any attempt to process them by conventional canning practices results in a loss of flavor, and an unattractive color.

Another important factor is the presence of enzymes which convert the starch in the green fruit to sugar during the ripening period (see chart below). When exposed to the air, even momentarily, these enzymes produce a darkening of the product which is objectionable.



HOW STARCH is converted to sugars during controlled ripening. When total sugars reach 19½% (upper right), bananas are ready for processing.

Process Developed Here

In 1951 Food Concentrates, Inc., Woodbridge, N. J., a subsidiary of United Fruit Co., set about to develop a process that would overcome the above mentioned obstacles.

And after two years, of research and experimentation, a system was devised that—

A. Removed air from the fruit immediately after pulping, and handled the pulp in such a way that it was never exposed to air during processing and canning.

B. Flash sterilizes the product to an F_o value of 4 (a value of 1 was found satisfactory, however, this gave an extra factor of safety), then quickly cools it below 80F. to prevent degradation.

C. Cans the product aseptically.

Pilot runs were made at full production speeds and the canned product was stored in the warehouse at the Woodbridge plant. When tests of these products showed a shelf-life

exceeding a year without deterioration, the equipment was dismantled and shipped to Libertador, Dominican Republic.

Here, United Fruit Co. has banana farms employing the most advanced growing methods. On one of these a modern plant had been built to house the processing equipment. Also contained in the facility were conveyor equipped ripening rooms for the fruit, and storage areas for the canned product.

How Process Operates

Unlike other fruits, bananas cannot be allowed to ripen on the trees. So, at the proper degree of maturity they are harvested, brought to the plant and hung on overhead conveyors in the ripening rooms. Here under carefully controlled temperatures, humidities, and ventilation, the fruit is brought to the full-ripe stage desired for canning.

Bunches of ripe fruit are conveyed to a washing station where they are sprayed with a chlorine solution, to remove surface dirt and any spray residues, then proceed to the peeling line (accompanying drawing). Here workers remove the peels and place the fruit on a belt that feeds the pulper. Peels are conveyed to the refuse conveyor.

To minimize air incorporation that would quickly produce browning, the fruit is pulped by mashing instead of by beating. Then it is drawn into a deaerating chamber operating under 27-in. of vacuum. From this point to the homogenizer the product moves under the above vacuum.

Product is homogenized to further break down the pulp then discharged to a 3-section Votator. First section of this unit heats the pulp quickly to desired sterilizing temperature, while the other two speedily cool it to approximately 80F. for filling. First of the cooling sections uses tower water. The second one employs chilled water which is refrigerated by Freon units. Product is exposed to temperatures above 120F. for less than ½-min.

Cooled product discharges to a Martin aseptic unit where it is packed in No. 10 tinned cans. These are closed with enamel covers.

Employs Special Container

This type of container was adopted to insure retention of the bright color in the product, yet eliminate the unsightly discoloration of the tinned lid following extended storage.

For bananas have a corrosive effect on tin, but lose their bright color when packed in enamel cans. By combining the two, the tin body insures retention of color in the puree without becoming appreciably discolored, and the enamel isn't affected by the headspace gas.

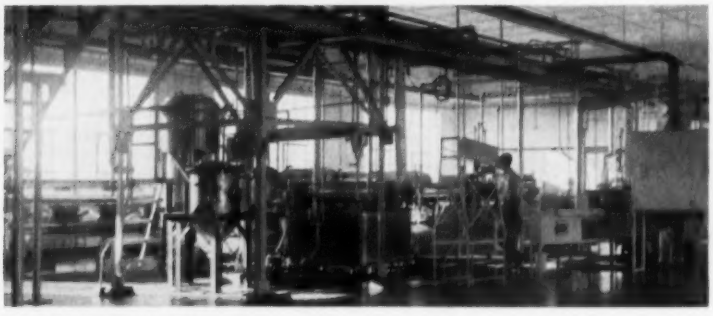
Quality Control

As previously mentioned, the plant is modern with all windows screened. It is equipped with a complete laboratory in which routine examinations are made on both raw and finished products.

A number of samples are taken from each run and incubated at 85 and 98F. Other tests include sugar analyses, pH and titratable acidity, solids, and foreign materials.

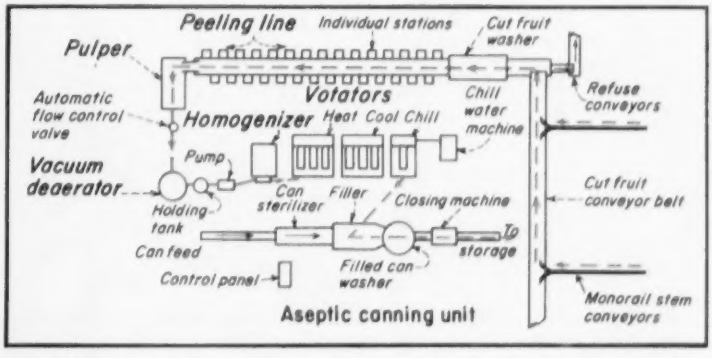
Warehouse for storage of canned products is cooled to 73F. Present capacity is approximately 20,000 lb. of puree per 8-hr. day. —*End*

Plant is Modern and Well Equipped



PROCESSING AREA has large windows, high ceilings, well-drained floors. Note Votators (center) and aseptic canning unit (right).

MARTIN aseptic canning unit fills previously sterilized and cooled product into sterile cans. Puree has shelf-life exceeding one year.



FRUIT is conveyed from ripening rooms to peeling line, then belt moves it to pulper. From here it goes to vacuum deaerator that eliminates air, then flows in closed system to homogenizer and Votators, which flash-sterilize and cool the puree. Final step is aseptic canning in No. 10 tins.

Mr. Technologist: Here's How You Can Deliver "Plus Values"

—and thus increase your worth to the company, while boosting your prestige

Concluding PART II—Preparing Technical Digests, Creating New Products, Ranging Raw Materials, Making Personal Contacts*

W. R. VAN METER
Food Technologist, West Hartford, Conn.

YES, APPLYING your overall knowledge of the food field to areas beyond the laboratory will enable you, the food technologist, to greatly increase your value.

How you may do this in such pursuits as finding new uses for present products, aiding the salesmen with cogent information, and explaining key technical aspects to plant workers, has already been detailed in Part I.

But there are many more ways open to you–as will now be cited:

Digesting Technical Material

As part of your own reading to keep abreast of developments, you no doubt go over a good number of technical periodicals. So, why not share the fruits of such reading with others in your organization?

It is a rare executive officer, sales manager, or production v.-p. who isn't interested in every bit of information about those things or happenings that are likely to affect the field in which his company operates

But few of these men ever find sufficient time for such reading.

Accordingly, as a technologist, why not regularly make brief digests of specially pertinent articles and send them to the top men?

The form in which you offer these digests may be varied according to the needs as you see them. Above all, however, each should be brief and to the point.

Possibly the best way is to confine each one within a single page, giving a concise abstract of the article, with a reference to the original source in case the recipient should be interested in obtaining more details.

Creating New Products

As a food technologist, it will be part of your job to work on new-product developments–some of the time at least. Most new products, of course, begin with an idea. Quite frequently, they get their start following some dissatisfaction with an existing arrangement.

In this connection there is the story regarding a canner's wife, Mrs. Dan Gerber, back in the '30s. She had several small children and was considerably irritated with the messy, time-consuming chore of preparing strained vegetables for her youngest, a baby just beginning to take solid foods. She complained to her husband about it.

Because he was a canner–but even more because he had imagination–he did something about his wife's complaint.

He began experimenting with the preparation of strained vegetables on a commercial scale. And the baby food business that Dan Gerber thus pioneered is today a very sizable segment of the food industry.

Mrs. Gerber is certainly not the first wife and mother to complain about the lack of ready-made strained vegetables for her child. Nor was her husband the first to listen to such complaints.

But he evidently was the first to listen with sufficient imagination and to have the drive to apply his technical skills to do something about the idea.

Maybe too many food technologists tend to lose their ability to wonder, to imagine, to dream, to be curious about the world in general. Forces somewhere along the line to acquiring technical skills and sound methodology may have worked to blunt their imaginative powers. But such powers can be resharpened.

At any rate, if you are lucky enough to have a wife, listen to her comments about foods.

In truth, there are times when what works out fine in the laboratory is not quite right in the kitchen. A woman in her own kitchen is not a laboratory assistant. It's worth listening to her complaints and watching the way she operates.

Another thing about new-product ideas: The modern

. . . Preparing digests

* For Part I, see FE Mar., p. 65.

supermarket is perhaps the greatest free show on earth, the biggest constantly changing exhibition of food products to be found anywhere. Why not look in on this array of products once a month, just to see what is new and different?

We don't mean when you go shopping, but as a separate thing—as a studied part of your attempt to keep up-to-date. In short, to look, to learn, and to pick up a few ideas as well as samples of the new products cooked up for Mrs. Housewife by some of the best technical brains in the food business.

Also with respect to new products, why not fix up a small laboratory at home? This would seem to be a natural thing for a food technologist to have. There may be ideas you want to develop a bit before displaying them to other eyes. There may be just the first faint flickering of something that you are not even sure can head toward first base. A home lab—very simple in scope—could be an ideal place for working on such things.

For the technologist who works for one of the very large corporations, there may be, for good and sufficient reasons, an 'organizational frowning' upon such personal puttering. That you will have to determine for yourself. But at least keep the home lab in mind.

Ranging Raw Materials

It goes without saying that, while in college, you acquired at least a speaking acquaintance with most of the raw materials of the food industry. But have you kept up with the newer ones?

It must be remembered that suppliers are also looking for new products, and they keep on bringing out improved materials for the food processor.

Consequently, you must keep up-to-date with new developments in this field, too. So, read the advertisements in the trade journals, study the literature and informative material supplied by manufacturers, and talk to their salesmen when they call.

Of course, this will take some of your time, but such visits usually produce pertinent information.

It is a peculiar thing that some food technologists gripe about seeing a salesman for a mere 5 min., yet think nothing of spending 10 or 15 min. twice a day in coffee breaks.

Get to know the sources of supply for as many as possible of the materials used in the various food fields. To recognize the advantage of this, just consider how often very valuable time is lost in beginning new projects due to inability to locate needed raw materials. This is particularly the case if the project is at all outside the usual run of your company's activities.

Personal Contacts That Pay

Get to know as many people as you can in your field and in related ones. You should have friends and acquaintances scattered through the industry, home economics, university faculty groups, and the like. There will be many times when the contacts you have made will constitute a big plus for you and your employer.

An excellent place to make these contacts is through the local-section activities and national meetings of professional groups. Through active participation in these affairs, you can contribute greatly to your own development, while at the same time strengthening the position of the scientist in the public mind.

The food field is too big for anyone to know all phases of it. It is too fast moving for all of it to be in the books and journals. But you will be surprised at how frequently a friend can answer a question that puts you on the trail of some much wanted information.

This, too, works both ways. You will be called on by others who want to locate specific material, or who want an opinion on competing types of equipment required for a job. Your stature will grow due to the valued role you play relative to the dozens of queries that constantly come up in the working day.

Technical training is a multi-purpose, versatile tool. Remember this and regard your schooling as something to be used in solving many problems. It is a training that can be of great value.

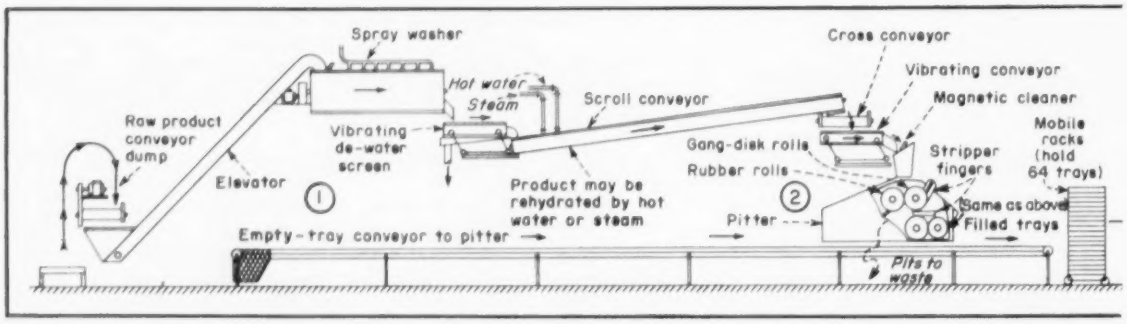
But it must be used in as many ways as possible to realize its full potential.

It's not only in the laboratory or on the production line that you can give your employer that extremely important plus-value—but also in the part you play as an active member of the business team. —*End*

. . . Creating new products

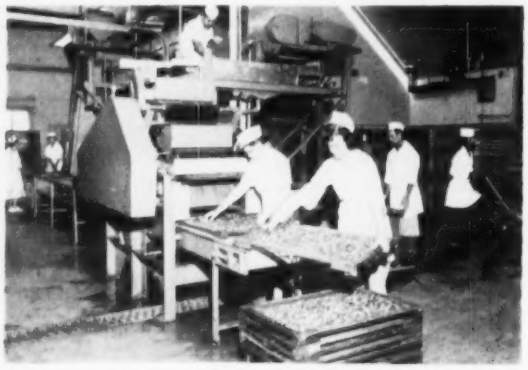
. . . Ranging raw materials

. . . Making contacts



OPERATION FLOW: Raw dates are initially elevated to go through spray washer–Point (1). When necessary, they're softened by steaming or water-heating. Pitting –Point (2)–is next. The pitter incorporates two sets of dual rolls. Upper set removes pits, lower takes out calyxes. Product then drops on trays, and pits and

1 DATES are manually dumped on short cross-conveyor (left), then are raised to washer (above). Conveyor on right moves empty receiving trays (they're now all-metal) to pitter (seen in rear).



2 OUT OF combination pitting and calyxing unit comes fruit onto trays. It is evenly spread, then trays are placed in mobile racks. These are moved on to the dehydration tunnels.

New *Product* – New *Process*

Granule-form dates become a major ingredient for cake mixes . . . And astute process engineering assures large, quality output to meet big demand

HILLMAN YOWELL and C. R. HAVIGHORST

Plant Manager, Calif. Date Growers Assn.; and Senior Associate Editor, "Food Engineering"

INCORPORATING the best features of advanced dehydration-process design, the new date-granule plant seen here reveals notable engineering ingenuity.

The line is of outstanding interest because–as a matter of sheer expediency–most of the equipment was specially designed and fabricated for this process. Only a few conventional units were adaptable.

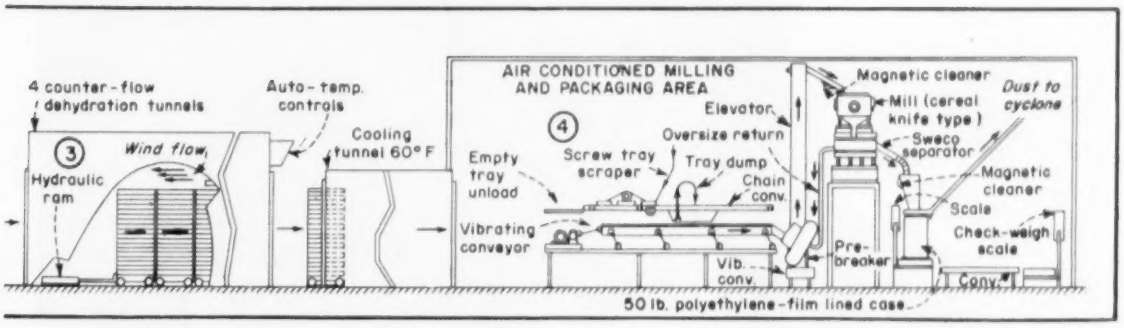
Operated by the California Date Growers Assn., the Indio, Calif., facility uses small-size dates (graded from the flow going into the conventional fresh-fruit packages) to prepare its granule product. Among the special processing units employed are–

A top-efficient combination pitting and calyxing machine; a series of four dehydration tunnels with automatic temperature controls (fourth unit being used as a finisher); and a milling and separating system that feeds the final product into cases. Further, there is a steam-and-water arrangement that softens the fruit to expedite pitting.

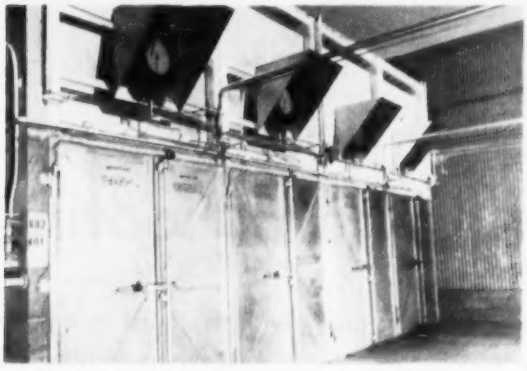
The entire interior of the plant is air conditioned, with humidity and temperature very closely controlled in the milling-packaging room, where moisture could affect product quality.

The granules were developed as an ingredient for the rapidly growing

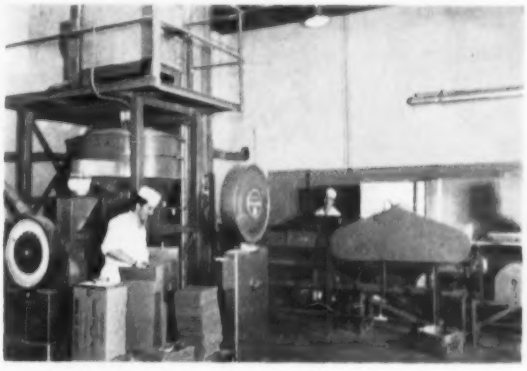
System for Quality Control and Worker Comfort Is a Feature



calyxes are discharged to waste. Following dehydration (3), product is cooled, then dumped onto conveyor (4) leading to milling system. Oversized particles from separator are recycled. Properly sized product is chuted to plant's packaging area. Note that magnetic cleaners are used at two points.



3 TUNNELS are four in number. Racks discharged from first three proceed through fourth (far right) which is the finishing unit. Note automatically recording temperature controls atop doors of each tunnel.



4 MILLING and separating follow (in units seen in rear at left). Then product is packaged (foreground) in 50-lb. cases that have protective polyethylene liner bags. After check-weighing, cases are ready for shipment.

cake-mix varieties. And this is the date field's first large-scale manufacturing advance in many years.*

Demand for the product now consumes a large proportion of the commercial grade (small) fruit.

Picture of Process

Our graphic combination of a detailed diagram along with photos clearly delineates the new process, making extensive text descriptions unnecessary.

As in any process, there are several major and some critical operations here. Actually involved is a process which is additional to the conventional preparation of dates for consumption in the whole-fruit form.

First, as a matter of harvesting economics, dates are left on the palms until 30-40% of the clusters are ripe. Usually, this means that the expensive job of picking is done six times a season.

In the same cluster, individual dates mature at different times. And in this dry climate, with temperatures sometimes as high as 120 deg. F., the small fruit that matures first tends to dehydrate, making mechanical pitting difficult.

In this process, either hot water or steam, at atmospheric pressure, is used to partially rehydrate and soften the fruit by heating to about 165F. before pitting.

Pitting and calyxing (mechanical removal of calyx) are done in the same machine. It is comprised of two sets of dual rolls. In each set, one roll is of soft rubber and the other comprised of steel disks having blunt teeth. The disks are set apart, yet the interstices are so small that pits cannot lodge between them.

In operation, pits and calyxes stick to the rubber rolls and are removed by a scraper. The pitted product imbeds in the interstices of the disk-roll. It is removed by stripper fingers and dropped on trays beneath the machine. Both pits and calyxes are discarded as waste.

Temperature and air volume in the four dehydration tunnels are automatically regulated. Each tunnel is equipped with both wet and dry bulb instruments: For Tunnels 1, 2, and 3, wet bulb 96-102F. and dry bulb 162-166F., approx. And for Finishing Tunnel 4, wet bulb 86-90F. and dry bulb 162-166F.

A 50-Bhp. boiler provides steam to the individual tunnel coils. And 10-hp. 38-in. fans develop 12,000 cfm. in each tunnel.

(Turn to page 90)

* Specifically, this kind of processed fruit was visualized some years ago by Dr. W. V. Cruess, director emeritus, Food Technology Div., U. of California, as a means of utilizing small-size dates. But the idea remained dormant until General Mills Co. perceived a use for the granules in its new Betty Crocker Date Bar Mix.

1 SCARIFY old floors with pneumatic drills or chisels to get down to clean concrete before applying the heavy-duty emery-concrete surface.

How to Get Iron-Hard Flooring

Screeded over new or old surfaces, concrete made with this hard rock gives superior protection under heavy-load conditions . . . Adds years to floor life

WALTER R. MAGUIRE

President, Walter Maguire Co., Inc., New York City

RESURFACING of worn-out floors in process areas can cost more than the actual cash outlay—it can lead to expensive down time. Therefore, installation of a new working surface should be approached, with longevity in mind. And no pains should be spared to make sure that the workmanship and materials are right.

One flooring material that has given exceptional results—lasting up to ten years without attention—is an iron-hard concrete containing emery aggregate, a natural rock mined in the eastern U.S.

This material can be applied in layers of ¾ in. or more on "green" concrete slabs or old bases. Special techniques are used for each application.

How to Mix the Concrete

The crushed and graded emery aggregate (bought in bags) is mixed with either Portland or high-early-strength cement in the proportion of 2 bags aggregate to 1 bag cement and 3½ gal. water.

It should be machine mixed whenever possible. And aggregate and cement should be thoroughly blended before adding water. After water is added, mixing should continue for at least 3 min.

Be sure you use water that is clean and free from oil, acid, salt, organic matter, or other deleterious substances. However, iron oxides can be added to color the concrete. If hand mixing is necessary, be sure the mixing surface is clean.

Monolithic Applications

Addition of the heavy-duty coating to "green" concrete bases before they have set 24 hr. is termed monolithic coating.

Before this concrete base has hardened, it should be roughened with a rake or grooved roller.

Then as soon as the base is hardened (so that you can step on it without leaving an impression), emery mix is spread evenly on the base course to a minimum depth of ¾ in. The surface should be immediately screeded to proper level, the edges well tamped, and the entire surface rolled with a heavy roller (weighing at least 150 lb. per lineal foot of roller).

Surface is then smoothed with an electric- or gas-powered disk-type floater (weighing not less than 185 lb.). About 30 min. later, float is run over the surface again. This is all that is required for a non-slip surface. However, a hand-troweled finish can be applied if a very smooth surface is desired. The material can also be wood-floated or given a broom finish.

How to Cure the Floor

For long life and durability, the new floor surface must be properly cured. You can accomplish this with one of three methods:

1. **Liquid chemical cure:** Certain chemicals can hasten curing by

2 CLEAN surface with water blast. Soak concrete, scrub on grout.

3 APPLY emery mix and roll. Use heavy power-driven float for non-skid surface, following up with hand floating for smooth floors.

With Emery-Aggregate Concrete

closing the floor surface, thus preventing evaporation of moisture from the concrete. These liquid chemicals are applied with either a mop or spray (an ordinary garden spray will do).

2. **Water cure:** Probably the oldest method for curing is to keep the floor continuously wet by spraying, flooding, or covering it with wet burlap or sand.

3. **Membrane cure:** Cover finished floor with waterproof, non-staining, membrane paper that has sufficient strength to resist wear and abrasion, and weighs not less than 7.5 oz. per sq. yd. Lay paper with air-tight joints.

Areas surfaced with an emery aggregate flooring must be closed to all traffic for five days, and only used for light traffic for the next ten days. However, if a high-early-strength cement is used in the mix, curing is quicker and floor can be put in use within 72 hr.

Granolithic Application

When coating is applied to new concrete that has hardened for over 24 hr., or to an old concrete base, different tactics must be employed to insure a firm bond.

New concrete should be thoroughly roughened with a rake or grooved roller at the time it is laid. And just before applying the emery mix, this base must be rigorously scrubbed with clean water and stiff brushes or a high-pressure water spray. High pressure air and water can also be effectively combined in a single nozzle for this cleaning operation.

If base slab has become dry, it should be completely soaked to impregnate it. Then, excess water is removed, and a grout is applied. This is a mixture of one part cement and one part sand, mixed with water to the consistency of cream. It is worked into the surface with wire or bristle brooms.

Final application of the emery aggregate mix follows the monolithic process.

On old floors, proper preparation of the base slab is of critical importance.

You must scarify the entire surface with air-hammers, picks, or chisels. Resurfacing of badly cracked floors should not be attempted, because the fractures will appear in the new surface.

Old slab must be removed below the level of grease and oil penetration—to solid, clean concrete. Edges not abutting on walls should be cut down vertically to the full scarification depth. Avoid any feather edges.

Remove all dirt, dust, and loose aggregate with an industrial vacuum cleaner, and wash slab down. Then flood the concrete, soaking it with water for at least 10 hr. Apply the grout coating previously described.

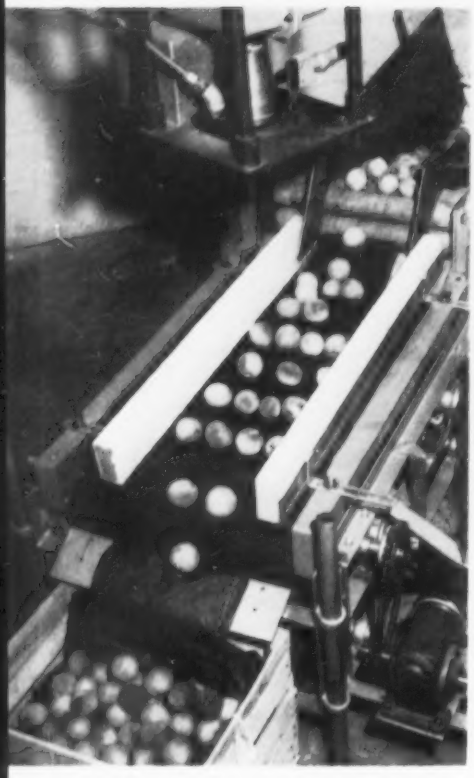
Bring scarified surface to within ¾ in. of grade with fill. Here, a good material consists of one part cement, two parts grit or pea gravel, and 4½ gal. of water per bag of cement.

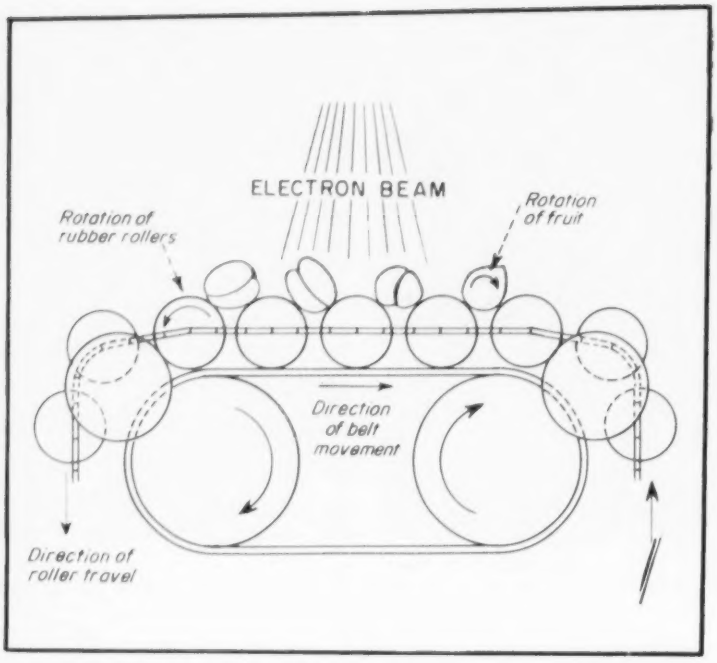
The emery aggregate mix is applied as mentioned before.

Where floor level can be raised ¾ in., it is possible to eliminate scarification by using one of the new bonding agents.

However, you should be careful not to select a bonding agent which is a water-phase or reversible material. For, these are subject to resolubility and loosening if water reaches them from either above or below.

A non-reversible bonding material provides a good moisture barrier. Manufacturer's directions for its application should be carefully followed. —*End*





TEST IRRADIATION SYSTEM (photoed left and diagrammed above) gives processors a preview of equipment likely to be introduced for in-plant cathode-raying of surfaces of fruits. Single trip through machine provides overall treatment, and fruit isn't damaged by process.

Rays Show Big Promise In Curbing Fruit Decay

Cathode beams are seen extending life of fresh fruits and vegetables. Tests on peaches show high possibilities for in-plant use. Flavor, odor, and appearance of fruit are unaffected

F. J. McARDLE, R. C. NICHOLAS, and D. E. WIANT
Michigan State University, East Lansing, Mich.

PUTTING ROTS TO ROUT with cathode rays is becoming a bright possibility for fruit processors. And nothing could be more welcome than such development of a fool-proof commercial process, considering the percentage of fruit-decay losses incurred.

Specifically, tests have now demonstrated that cathode-raying of the surfaces of fresh peaches will definitely control the major culprit—brown rot.

Foreshadowed in addition is the likely use of this type of irradiation on a number of other fresh foods.

Lab batches of various peaches not only have been protected from brown rot but also have come through without exhibiting any undesirable side effects. The fine fresh flavor, odor, and appearance were retained. Moreover, the fruit suffered no handling-damage during the radiation processing.

Experimental Results Detailed

Effects of four different doses on the incidence of brown rot on infected peaches after ten days' storage are summarized in our accompanying graph. The values shown are averages of three treatments (½ bu. of fruit per

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treatment) at each dose level used.

Data from the three varieties of fruit employed are combined, since no differences between them were observed. Radiation at 150,000 rep. (roentgen equivalent, physical) was most effective—reducing rot 95% (as gaged against that found on non-irradiated lots).

This was the highest dose level that could be applied with this conveyor design without added handling of the fruit.

A taste panel found no detectable changes in flavor, odor, or appearance of the treated peaches. Panel members could not tell irradiated from non-irradiated peeled halves and whole fruit in a triangle-type test (method wherein panelists attempt to pick the odd sample when it is presented along with two samples of a control).

Test Procedures

Since brown rot is a surface infection, control of the disease during the post-harvest period was under study in our investigation. Redhaven, Halehaven, and Elberta peach varieties were irradiated with cathode rays of low penetrating energy. The fruit employed was harvested at a hard, mature stage (average pressure test of 10 lb. on the pared cheeks, using Magness-Taylor Pressure tester, ⅝ in. head).

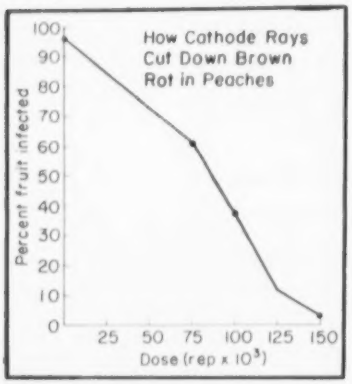
Half-bushel lots were experimentally infected with brown rot spores from decayed fruit. Then they were treated at one of four irradiation levels—75,000, 100,000, 125,000, and 150,000 rep.—by exposure to 1 mev. (million electron volt) cathode rays, using a General Electric linear resonance transformer electron accelerator.

For effective control of mold infection the irradiating had to be uniform over the entire fruit surfaces. This was effected by employing a specially designed roller-conveyor that turned the fruit as it passed through the electron beam.

Conveyor travel and rotation speed could be varied independently to get different radiation exposures. The rollers have a soft-rubber treading that forms a diagonal pattern over the surface of the conveyor, thus causing the fruit to rotate on several axes as it moves along. Conveyor speed settings for total surface irradiation of peaches were pre-determined by using agar casts containing a radio-sensitive dye*.

After irradiation, peaches were held ten days in a ripening cabinet maintained at room temperature. Then the brown-rot incidence (percent fruits infected) of each lot was determined by examining all the fruit for mold growth. —*End*

* McArdle, F. J. and Wiant, D. E. Tracer, "Technique Gages Raying of Irregular-Shape Foods." *FE* Jan. '56, p. 85.



IN 10 DAYS of storage at room temperature, brown rot infected 96% of un-rayed peaches (top left on scale). But cathode-beam doses strikingly reduced decay of four other lots with 150,000-rep. treatment (right) cutting infection virtually to zero.

Rayed . . . versus . . . Un-Rayed

Losses That Are Targeted

Seen above is a very graphic comparison of treated and untreated peaches—in this case test-lots of fruit held 10 days in a ripening cabinet.

Studies indicate that brown rot spoils 3.5% of peaches arriving at terminal markets.[1] In fact, railroads have reported claims (mainly citing brown rot) incurring payments exceeding 50% of the total revenue from peach shipments.[2]

However, losses on arrival don't really show how serious the problem is, since peaches subsequently held at room temperature for 24 hr. have suffered ten-fold that amount of decay. In addition, comparable losses are experienced by distributors and consumers.

Peach processors particularly find this mold a grave problem, since a ripening period is desirable for obtaining proper fruit maturity. This calls for three to seven days of ripening after harvesting and before processing. But the optimum conditions for this purpose—70 to 75 deg. F. temperature with high relative humidity—promote brown rot development.[3] Processors are discouraged from using the method due to the losses thus entailed.

Effective control, therefore, would bring notable savings of fruit, while upping product quality.—The Authors

[1] Haller, M. H., *Transportation, Storage, and Marketing of Peaches.* USDA Biblio Bul. 21, 1952.
[2] Winklepleck, R. L., "Peach Precooling and Loading Trials." *Peach Ann.*, 1951, Nat. Peach Council.
[3] Haller, M. H., "Handling and Transportation Problems in the Peach Industry." *Peach Ann.*, 1950, Nat. Peach Council.

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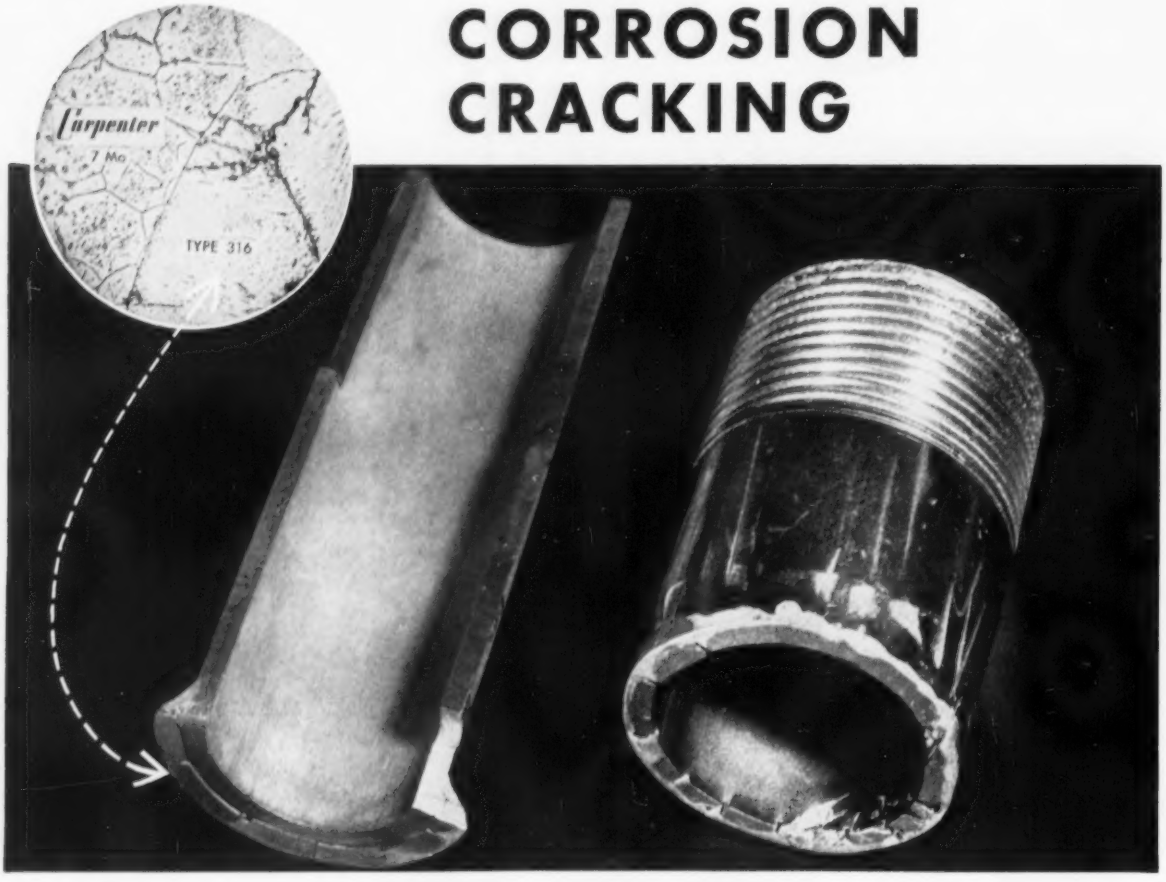

Carpenter 7 Mo Stainless Tubing & Pipe

Take a closer look at the above section of Carpenter 7Mo Stainless Pipe welded to a Type 316 fitting. See how stress corrosion cracking has ruined the fitting, just as it has destroyed the piece of stainless pipe at right.

Note how the cracks in the fitting stop abruptly when they reach the 7Mo pipe. And this pipe has already outlasted three such fittings. The photomicrograph shows the unmistakable proof.

If you have conditions where chlorides, caustic or sulphite solutions are present, Carpenter 7Mo's excellent resistance to general corrosion, pitting and stress corrosion cracking may prove to be a real cost-saver. Let's discuss your particular application now.

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Vacuum-nitrogen packager. It's one way to use . . .

Inert Gas—Shield for Film-Pack Food

New plastics popularize this protective technique — applied by vacuum and purge machines.

JOHN LaPOTA

Chemical Engineer, National Cylinder Gas Co., Chicago

SPECIAL ATTENTION has been focused on elimination of air from foods packed in plastic films.

One answer to this problem is the use of inert gases—a technique still in its infancy, but growing fast in popularity. The gases are introduced into the bag by vacuum-gas or purge methods to flush away oxygen and reduce oxidative changes and growth of undesirable organisms to a bare minimum (see boxed list for the multiple advantages).

The process—using nitrogen or carbon dioxide gases, or a mixture of the two—is already being applied to a wide variety of foods. Among these are cheese, frankfurters, sliced and chipped beefs, other pre-cooked meats, candy, fruit, nuts, baby foods, powdered milk, macaroni, marshmallows, powdered potatoes, and corn syrup.

The processing installation need not be large. Ryer Bros. Inc., Chicago, uses the technique to protect its sliced cheese. And the company employs only two slicing machines, a single packaging machine (Flex-Vac), a vacuum pump, and one nitrogen cylinder with regulator.

In operation, a worker at each slicer weighs cheese into ½-lb. lots and inserts them into preformed plastic bags. These travel by conveyor to the packager.

Here, machine operator places a package in each of the two chambers and closes the doors. Vacuum pump automatically exhausts air from the packages, then admits nitrogen under pressure to fill the "air space" around the product. A heat sealer, set at 340F., seals packages, the doors open, and pouches fall into a discharge chute.

Swift & Co. packages its sliced beef in a similar installation. Here, the nitrogen supply consists of six cylinders—three on the service bank, three in reserve.

What "Flexibles" to Use

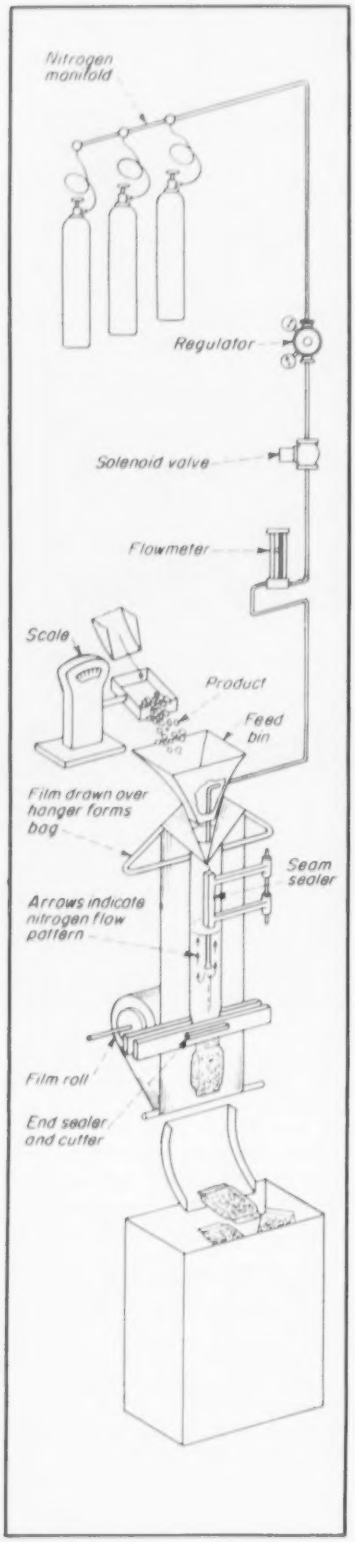
Although the inert gas method has been adapted to foods packed in rigid containers, probably most applications in the future will be for products in flexible films. Such materials must meet several requirements to be suitable for this type of packaging.

First, gas permeability of the plastic must be extremely low. Film manufacturers should be consulted for the specific permeability of any film under consideration.

Also, it should be tough, flexible under temperature changes, durable enough for storage and marketing, stiff enough for easy handling on printing and forming machines, and resistant to perforation.

How Non-Reactive Gas Protects Your Food

1. It lengthens shelf-life by slowing bacterial and mold growth.
2. Eliminates spoilage by cutting oxidation of fats and oils.
3. Avoids off-flavors from undesirable ketones and aldehydes.
4. Maintains caloric content by stopping oxygenation.
5. Reduces product loss from insect larvae that depend on air.
6. Retains product color by slowing chemical reactions.



PURGE TECHNIQUE employs inert gas to flush air from continuously formed pouch packages.

Of considerable importance: It should be capable of tight sealing on automatic filling machines. For gas tightness depends on the security of the side and end seals as much as it does on the film surface itself.

Finally, the film should be tasteless, odorless, non-toxic, and provide an attractive package.

One successful film (used by Swift) that meets these qualifications is a laminate of polyethylene and a cellophane that's coated with polyvinylidene chloride (Saran). Its permeability is extremely low.

As a single film, polyvinylidene chloride also has quite a low permeability rate, and it is giving excellent results in nitrogen packing of candy. Its tensile and tearing strengths are high, folding endurance is good, and resistance to greases and oils is excellent.

However, it is a difficult film to seal on automatic machines having impulse-type heat sealers. Electronic sealers give much better results.

Of all the single-layer films in use today, however polyester (Mylar) seems to offer the best combination: Low gas permeability, high strength, and excellent resistance to oils and greases.

But its high temperature resistance has made it difficult in the past to heat-seal. The high temperature needed to effect a seal caused the film to disorient at the seal and lose almost all its strength. This has been corrected by modifying standard wrappers and employing a solvent and heat seal combination.

Vacuum and Purge Gassing

Inert gas packaging of foods can be done with either of two methods —one employing a vacuum, the other a purging action.

Of the two, the vacuum technique gives the greater protection, because virtually all of the air is removed from the package before the inert gas is introduced.

At least one company (Standard Packaging Corp.) has a fully automatic unit that operates on roll-stock film for packaging by this method.

The purge-packaging technique is likewise readily adaptable to automatic methods in either bag-forming or overwrap machines. Several such units are now available.

In a bag former, roll film is formed into a tubular shape around the product filling tube, and is sealed lengthwise.

As food product drops into the film tube, inert gas is introduced through a small pipe, extending down inside the tube almost to the end sealer. The nitrogen, blown into the formed tube, causes an upward gas flow—carrying the air up and out of the tube. End sealer then closes the bag, and a cutter separates it from the tube.

The purging method, while not as efficient as the vacuum-gas technique, nevertheless does reduce oxygen content in the bag from 21% (normal content in air) to 0.5% or less.

Generally, flowrate of the purging gas must equal package volume per minute. That is, if the packages formed per minute contain a total volume of 2 cu. ft., then flowrate of the inert gas should be about 2 cu. ft.

Since product occupies most of the package volume, gas flowrate is actually many times that of the air being displaced.

Efficiency of air displacement depends on the amount of inert gas introduced in the purging action—and on its velocity. Flushing with five volumes of gas to one volume of air leaves very little air in the package. Theoretically, it reduces air content to ⅓ of its original volume. But too high a velocity reduces this displacement effect.

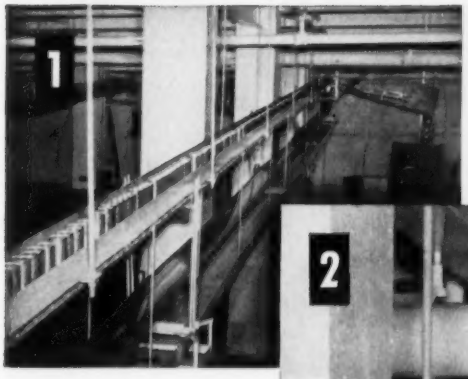
Set-Up of Gas Supply

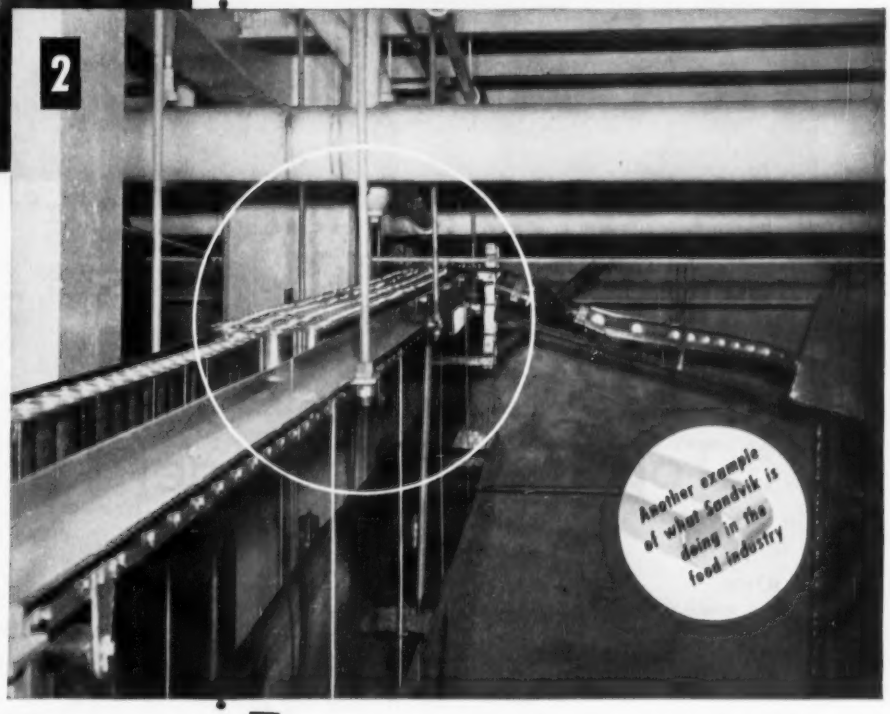
Successful packaging with either of the gassing techniques requires a constant, dependable supply of gas. For a small installation, this may amount to only a single cylinder. But larger installations should use a number of tanks—as many as ten—connected to a common manifold and arranged in two banks that permit independent operation of either bank or simultaneous use of both.

A regulator is installed in the bank manifold. It maintains constant delivery pressure regardless of the drop in cylinder pressure as gas is used. Two regulators, one on each bank, can be set so that the reserve bank comes on the line automatically when service bank is empty.

A surge tank, installed between regulator and packaging machine, avoids gas surge in the line and acts as a reservoir to supply a more uniform flow of gas. Pressure gage and flow meter in the supply line near the packaging machine give the operator continuous information on flow conditions. —*End*

Easier-Sliding Simplifies Can Handling On This SANDVIK STEEL-BELT CONVEYOR





1 Here are cans of Hershey's chocolate syrup carried by a Sandvik steel-belt conveyor. Normally, they move in single file to the take-off point.

2 But, when there's a delay . . . the cans keep coming, close ranks, form a column of four and mark time . . . with the smooth, Sandvik belt sliding easily under them until the take-off operation catches up. At times, there are four can columns, 60 feet long, marking time on the moving belt.

The smooth, low-friction surface of the solid steel band gives a Sandvik conveyor a special advantage for handling cans. They can be very easily slide-handled as they ride on the moving belt. This facilitates automatic storage en route and simple, slide-off discharge at any point with a minimum of belt wear. When extra "slide-ability" is required, the surface of the band can be lubricated.

SANDVIK STEEL BELT CONVEYORS

SS-71

Can You Improve Your Food Handling Operation With A Sandvik Steel-Belt Conveyor?

In addition to can conveyors, Sandvik supplies steel-belt units for handling a wide variety of foods, in various stages of preparation. These include meat, fish, vegetables, fruits, sugar, bakery products (on bake oven bands), margarine, candy, etc.

Why not look over your operation. See if there might be a place where the easy-to-keep sterile surface of a solid, stainless or carbon steel band could save money or step up production. Then, ask Sandvik for their engineering help and advice.

Sandvik builds complete conveyors to fit specific applications and provides engineering service to insure satisfactory operation. Belts can be of any length or width.

Write, wire or phone for further information.

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Conveyor Division
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Manufacturers of steel-belt conveyors for over forty years

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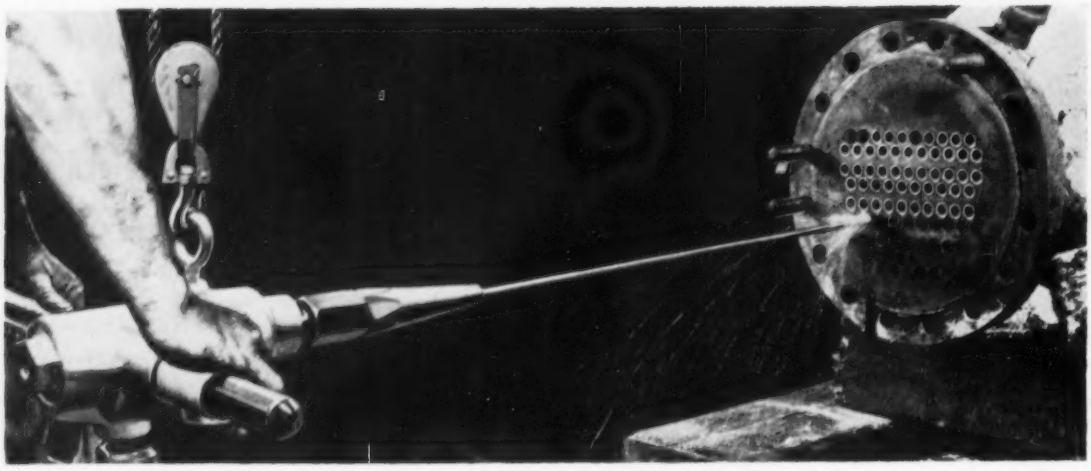


TUBE CLEANERS that are powered by air motors, are fastest and most efficient. This one is a drill-type unit. It has a hollow shaft for conveying either air or water to cool the bit and wash away the removed deposit.

Cleaning Tips for Clinching

Top Heat-Exchanger Performance

A. JOHN
Thomas C. Wilson, Inc., Long Island City, N. Y.

Practical program calls for running the right cleansing tools through your heat-transfer tubes at the proper maintenance intervals. This will assure you the maximum both in flow-rate and availability of "working" Btu's.

HEAT EXCHANGERS run at best efficiency and lowest operating cost when you hitch them to an aggressive maintenance program.

This is the way to avert plugged-up tubes—which are synonymous with low throughout at exhorbitant prices

To be sure you get the high performance designed into these continuous flow units, you must clean them with the proper tools at the right intervals of time.

Fouling and plugging of heat exchangers result from: Localized high temperature, solids precipitation, low flow rate through the tube, cooking-on of solids due to flow stoppage, and congealing liquids.

Deposits range from flint hard to soft and gummy. Some hard scales cling to metal walls with great tenacity. Others are readily dislodged by mechanical cleaning. Chemical composition of deposits includes calcium compounds, silicates, carbonates, algae, and iron oxide, to mention a few. Each type of scale calls for specific tools and methods.

Prior to selecting the mechanical cleaner for a tube job, you should consider these prime factors: Type and size of tubes, type and amount of deposit to be removed, and power available. Any unusual problem can be solved by consulting a manufacturer's representative.

All tube-cleaning devices operate on essentially the same principle: They "turbine" or "punch" the tubes with air-, water-, or steam-driven tools, or electrically-driven flexible-shaft units. A rotating cutter, brush, or other accessory, is attached to the motor and then driven through the tube to dislodge deposits.

One type of cleaner specifically designed for heat exchangers is a drill-like high-powered air motor operating outside the tube bundle. It has a hollow shaft holding the cutterbit, brush, or scraper. This provides means for introducing a scavenging agent that softens fouled matter, washes away debris, and keeps the bit cool.

When tubes have not been cleaned for some time and where so much hard scale has accumulated that a cutterhead will not enter, a drillhead, mounted on a universal joint, must be employed. Actually, drillheads are similar in action to cutterheads, but they can enter smaller openings. They are "roughing tools" used only as a first pass through the tube to eliminate the worst part of the scale.

For soft deposits in tubes with curves and sharp bends, there are expanding brushes and scrapers. In the expanding brush, wires are arranged in tufts or clusters, forming a simple replaceable cartridge. Being adjustable to tube size, the expanding brush wears better than a fixed-diameter brush. It will clean 10 to 20 times as many tubes before wearing out.

Expanding scrapers are similar to expanding brushes, but instead of brush-wire refills, hardened steel scraper blades are fixed to the sides of the holder. They are useful for removing soft, gummy, or wet deposits that would clog brush bristles or cutter-wheel teeth.

Power for driving the cleaner is mainly determined by what is available at the installation. Air power is fastest, most powerful, and most efficient. Once the cleaner has loosened them, the deposits are blown out of the tube by exhaust air of the motor. Recommended pressure is 80 to 100 psi., although it is possible to use as low as 50 psi.

Water-driven cleaners, while usually not as powerful as those driven by air, are quieter, and the water flushes the tube while cleaning. Operating pressure varies from 125 to 250 psi., with the smaller units requiring the higher pressures. Drains are needed here for the exhaust water.

Steam and air-powered units are almost alike and require the same pressure. Less leeway is permitted in steam pressure ratings, however. At those below 80 psi., too much condensation may occur, and above 100 psi. the operation may become hazardous due to increased temperature.

All these driving media have good and bad points, and the choice often depends on individual taste.

For example, air cleaners are the most popular. They are fast and powerful, but are noisy and stir up dust. Water cleaners hold down dust, but are slower and require rapid drainage facilities. Steam cleaners have a desirable softening effect on some deposits, but live steam is a personnel hazard. Electric cleaners are quiet, and with certain tubing are the only cleaners that can be used.

Maintenance Schedules Can Help

A good tube maintenance schedule must take into account operating conditions of a given plant, including the water supply.

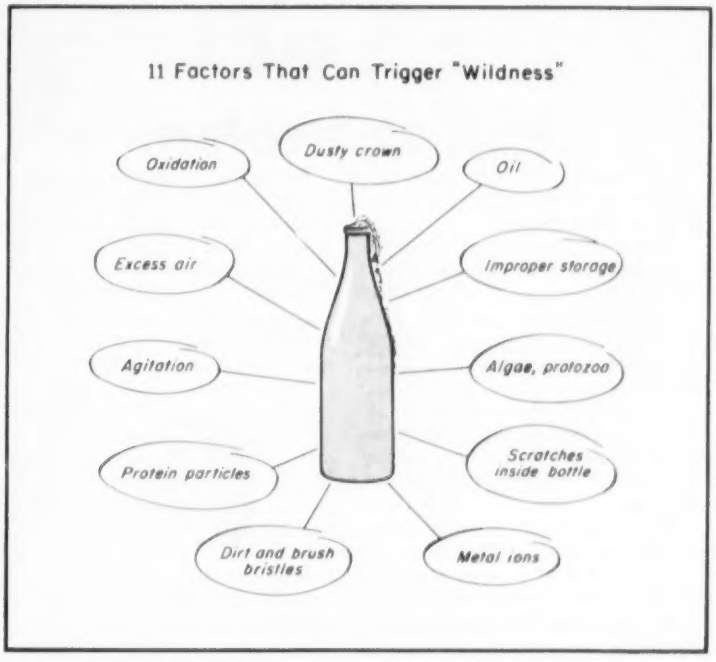
When equipment is operating continuously, cleaning should be scheduled either during plant shutdowns or at periods of minimum load.

Best way to make sure tubes are cleaned on time is to keep a card file—listing the following facts on separate cards for each exchanger:

1. **Frequency of cleaning**
2. **Last date cleaned**
3. **Condition of tubes at last downtime**
4. **Character of deposits**
5. **Equipment used in cleaning**
6. **Condition of tube cleaning equipment**

Keeping a tube cleaning "timetable" for each unit pays off in several ways. First, each unit can be taken care of at the proper time, thus preventing excessive scale accumulation. Moreover, a glance at the records will tell whether scale thickness is out of the ordinary. Such a timetable will also serve as a reminder to get spare parts needed for cleaning.

If present condition is known and also the date of the last cleaning, a good working schedule can be drafted. Sticking to this maintenance schedule and using the right cleaning tools will cut your operating costs. —*End*



REASONS FOR ERUPTIONS of your bottle beverages have now been tracked down. The causes number nearly a dozen—but there are practical quality control remedies for all of them.

Averting Beverage 'Gushing'

Here are the basic causes of this spill-over from bottled drinks . . . Trouble spots to look for . . . Corrective measures to take

NINO F. INSALATA

Associate Bacteriologist, General Foods Corp., Central Laboratories, White Plains, N. Y. (formerly with White Rock Corp., Brooklyn, where he conducted the work upon which this report is based)

GUSHING OF CARBONATED drinks and brews—called 'wildness' by brewers and soft beverage manufacturers—can now be traced to fuze-like factors that start chain reactions leading to eruptions of foaming liquid from the bottles.

This overflow is unwanted and often unexpected, but the problem can usually be licked by proper attention at known trouble spots.

Soft drinks are more prone to wildness than beer. Composed of water, sugar, color, salts, flavors, and up to five volumes of CO_2 per volume of beverage, they lack colloidal protein material such as forms a stabilizing

surface membrane in brewer's products.

How Soft Drinks Are Affected

Among the causes of wildness are: (1) Presence of nuclei, (2) too much air in beverage, (3) excessive agitation, and (4) improper storage.

According to the nucleole theory, particles in the beverage act as nuclei initiating almost instantaneous gushing when bottles are opened. Size and shape of the nuclei are controlling factors. Smooth, round, particles cause less reaction than rough, irregular ones.

Major offenders here are dirty bottles. The trouble may result from: Poor soaker compartment control that does not properly cleanse interior of bottles; carry-over from last compartment of soaker to rinse water; or loose brush-bristles.[3]

Soaker carry-over may contain ferric oxide, aluminum hydroxide, iron, nickel, cobalt, copper, tin, and other metals. As little as 1 ppm. has been found critical in producing wildness.

Contamination can result from debris trapped in the bristles of brushes, or the bristles themselves. Black nylon bristles resist accumulation of deposits, are easier to sanitize, and are more readily detected at the inspection light.

Also, improperly adjusted soaker brushes can scratch the bottoms of bottles. And worn brushes can cause scoring if their metallic neck pieces touch the glass. Scratches function much the same as nuclei—releasing long chains of CO_2 bubbles, that rise to the top of the liquid and cause "flatness" or loss of carbonation.

Moldy or dusty crowns provide another source of nuclei. Remedy is storage that prevents moldiness and accumulation of dust. A cool, dry area, not in direct contact with the warehouse floor, is best. Cartons containing crowns should be wiped clean of dust before opening. For final protection, the crown-hopper should be covered, and equipped with an air hose to blow out particles.

Algae and protozoa in the finished product also produce wildness.[2] These organisms originate in the water supply and, therefore, enter the product undetected. During storage of the beverage, they reproduce and form a flocculent mat-like mass in the bottom of the bottle. This spoils the appearance and also triggers CO_2, increasing the likelihood of wildness.[6]

Because these organisms enter by way of the water supply, they often contaminate the entire system—including sand and carbon filters used for clarification. Remedy is a reverse flush, using 10 ppm. chlorine, starting from the bottom of the carbon filter. This destroys organisms in the water, sanitizes sand and carbon filters, removes pockets of algae trapped in the carbon filter, and prevents channeling.

Oil particles, carried over with CO_2 from the dry ice converters, are another source of wildness. Oil rings form in the neck of the bottle, changing the surface tension at the air-liquid interface. Weekly cleaning of the converter usually eliminates this hazard.

Other Causes and Their Control

Presence of excessive amounts of air in the beverage may also result in wildness. Since the solubility of air is lower than that of CO_2, there is a greater tendency for it to escape from the beverage when the bottle is opened. When air bubbles begin to rise they start a chain reaction that causes the CO_2 to evolve.

Sources of air include water, syrup, and CO_2. Also, during filling all the air may not be displaced from bottles and more may enter as they are conveyed to the crowner. Precautions include deaeration of water and CO_2 gas, and use of snift valves on the filler.

Excessive agitation of the bottle, immediately before or after opening, disturbs balance of liquid and gaseous phases, resulting in wildness.

Other contributing factors are undue age of product, freezing in storage, or stratification. Rotation of stored bottles and proper control of temperature provide the correction.

How Beer Is Affected

Causes of wildness in beer parallel those affecting soft drinks.

Nuclei formation resulting from metal ions can be controlled by use of water-soluble salts of ethylenediamine tetra-acetic acid (a chelating agent)[4]. In concentrations of 1 lb. to 50 bbl. beverage, it binds substantially all of the metal ions in a non-ionized form. This prevents the ions from serving as nuclei, and they then can no longer disrupt and puncture the liquid-gas boundary surface tension.

In beer, colloidal protein particles accumulate at the surface of the liquid and form a film.

Dr. H. U. Rhodes, St. Louis University, has made photomicrographs of particles from samples of non-gushing and of gushing beer. Found in a concentration of about 1 ppm., the particles were protein in nature and alkali-soluble. Magnification of 4,500X revealed that: (1) Normal beer has smooth, round particles, and (2) gushing beer has irregular, jagged particles, capable of acting as nuclei for releasing CO_2.

The gas bubbles liberated are enclosed in a thin membraneous skin. Their size and shape are controlled by the surface tension of the liquid. Number of bubbles is proportionate to concentration of particles in beer. High concentration of bubbles, and thick films at surface of the liquid, will result in rupture on the surface-film and explosive escape of the trapped gas.

Incomplete filtration is blamed for providing colloidal material for the membrane. And pasteurization, by influencing surface coagulation of the proteins, regulates membrane thickness.[5] Increased coagulation results in a denser membrane that can retain more gas. But when it ruptures, gushing is produced.

Protein destabilization and increased viscosity may result from oxidation. This converts globular proteins to straight-chain polypeptides. Instead of retaining high concentrations of gas, the thinner membranes allow CO_2 to escape to the atmosphere.

But oxidation, when coupled with excess air in the bottle and extreme chilling, causes increased viscosity of the liquid and thickening of surface-membranes. Moreover, this condition results in shifting of protein charges toward a more positive state. Since CO_2 (positively charged) is normally bound to negative charges, there will be an expulsion of gas.

The dual reaction favors wildness, but wild beer tends to become more stable when stored at warmer temperatures.[6]

Malt, as influenced by seasonal changes, may also increase wildness in beer, but the specific factors here have not yet been determined.

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6. Gray, Philip P. *Experiments on Wild Beer*. Wallerstein Laboratories Bul. No. 39, Dec. 1949.

—End

Continental's NEW Savorlock Cans for instant coffee

are good for your customers

good for you

Your customers will go for instant coffee in Savorlock cans, because a Savorlock gives extra flavor protection — not only in the store, but in the home. After the tamper-proof glassine seal is broken, the lock top provides a positive reseal in day-to-day use.

Savorlock cans are designed to make your life more pleasant, too. Special construction permits fast filling, secure stacking and maximum display on store shelves. In addition, Savorlock cans give you colorful, top-to-bottom lithography by Continental craftsmen.

Available in 2- and 6-oz. sizes, Savorlock cans are already a commercial success. Let them start selling for you. Call Continental for fast delivery.

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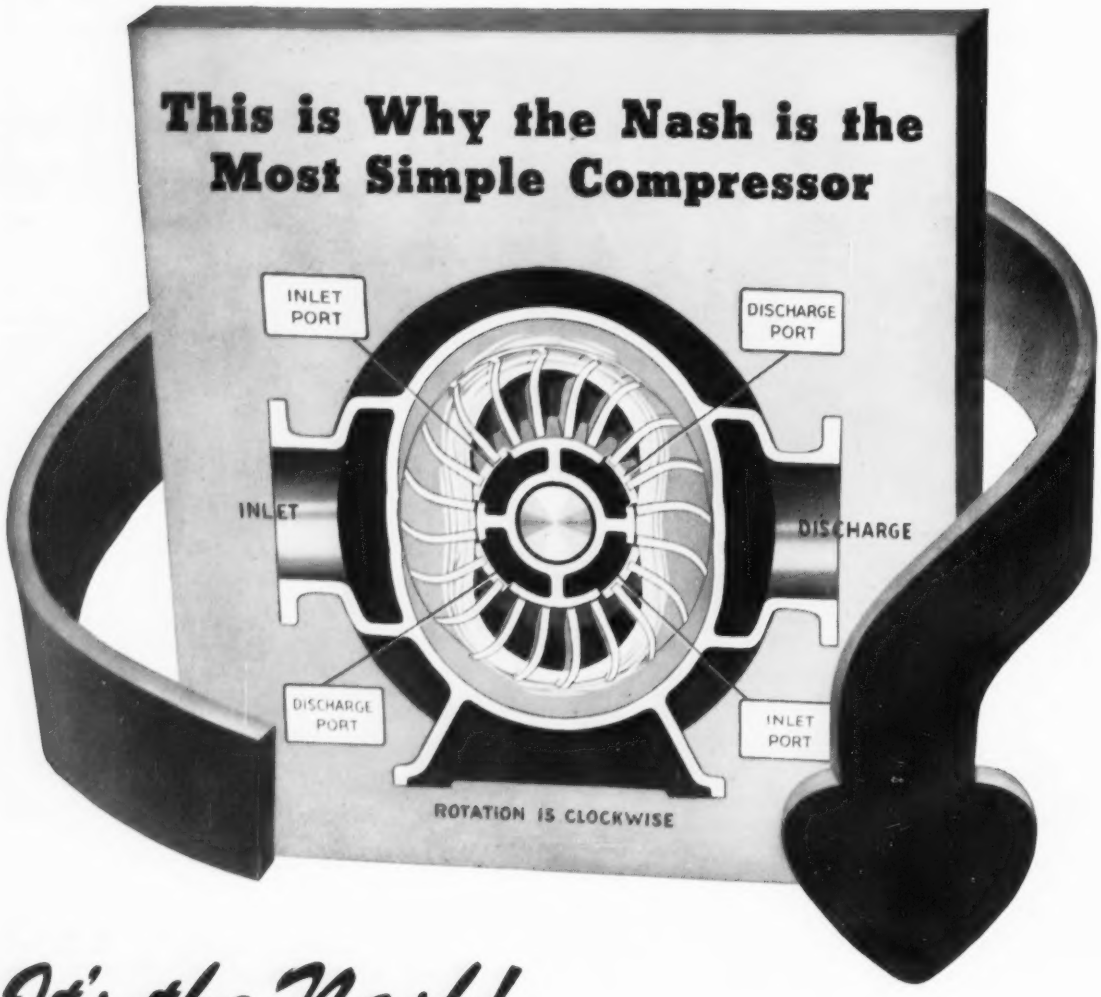
QUALITY Continental SERVICE

This is Why the Nash is the Most Simple Compressor



It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods Data on these pumps sent immediately on request

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY
313 WILSON, SO. NORWALK, CONN.

Simple Design 'Twists' Improve Cook Tank

Sanitary features are promoted, new versatility gained—and at saving in both materials and labor—when close scrutiny by AMIF engineers leads to revision of sausage-process unit . . . Shows how eagle-eyeing of your plant equipment can put you on path to better, more efficient engineering

L. J. PIRCON
American Meat Institute Foundation, Chicago

YOU CAN MAKE time-tested equipment better—by redesigning it.

Not infrequently, as a matter of fact, the beneficial changes can be carried out at little or no extra cost. A particular instance is the recent experience of American Meat Institute Foundation engineers with an ordinary sausage-cook tank.

After carefully scrutinizing this equipment, which was employed in laboratory sausage studies, they made modifications that resulted in a more sanitary, easier cleaned unit of increased versatility.

What's more, costs were saved on materials and labor.

Approach to Modifications

In such projects as these, the advantages already inherent in use-tested equipment should never be minimized. However, your practical analysis may disclose ways in which such standard designs can be modified to gain new benefits.

Any piece of equipment acquired for employment in the smaller processing operations should, if possible, be adaptable to several uses to avoid need for additional specialized units. Naturally, such equipment should be fabricated of proper materials and constructed for efficient operation. Further, the cost—capital outlay required—ought not be out of line.

With these specific considerations in mind, the Foundation engineers launched their examination of the cook-tanks in question. Some designs, we noted, incorporated welded angles at top edges, purpose being to rigidize the wall and assure safety.

In our case, however, we found that need for such welded angles was eliminated by rounding the sheet of tank wall (Photo 1). This simple design change facilitated cleaning. And simultaneously, habitats for bacteria (areas not reached by hot water) were abolished. Furthermore, chances of injury to personnel have been minimized, since there are no more sharp or square edges.

In addition, the design incorporated filleted inside tank corners to facilitate cleaning.

The new tank cover has a drip apron, and its edges are curved to fit top edge of tank (Photo 2). Hinges of this cover are equipped with top reinforced plates, which rest against backstops at rear of tank when cover is fixed in open position. A handle at front of cover simplifies opening (Photo 3).

Also smooth surfaced tubular legs, with nickel-plated brass-bell adjustable feet (seen in Photo 3) were used to prevent dirt accumulations.

Instead of welding stainless steel angle irons to inside walls of cook tank to create the conventional racks for sausage sticks, the Foundation provided a removable stainless steel rack (seen in Photo 1). This feature offers these advantages:

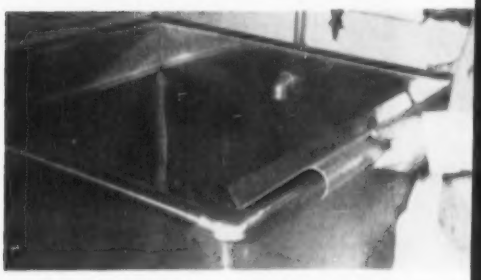
1. Tank is easier to clean, because rack is removable.

2. Stick holders can be removed to provide a smooth inside wall, with no projections to interfere when conducting tank operations other than sausage cooking.

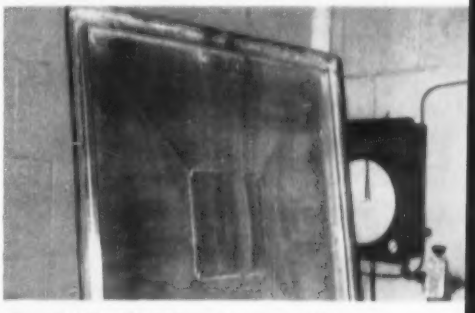
A perforated false bottom prevents hanging sausages from coming in contact with heater tubes. Moreover, this facilitates stacking of loaf and ham molds. The unit's heating coils are fitted in the same plane.

This location in a one-plane system eliminates the old problem of

Closeups of Changes



1 BY ROUNDING sheet of tank wall, improved top edges are achieved, with no welded angles needed. Rack (right) fits snug on curved edge.

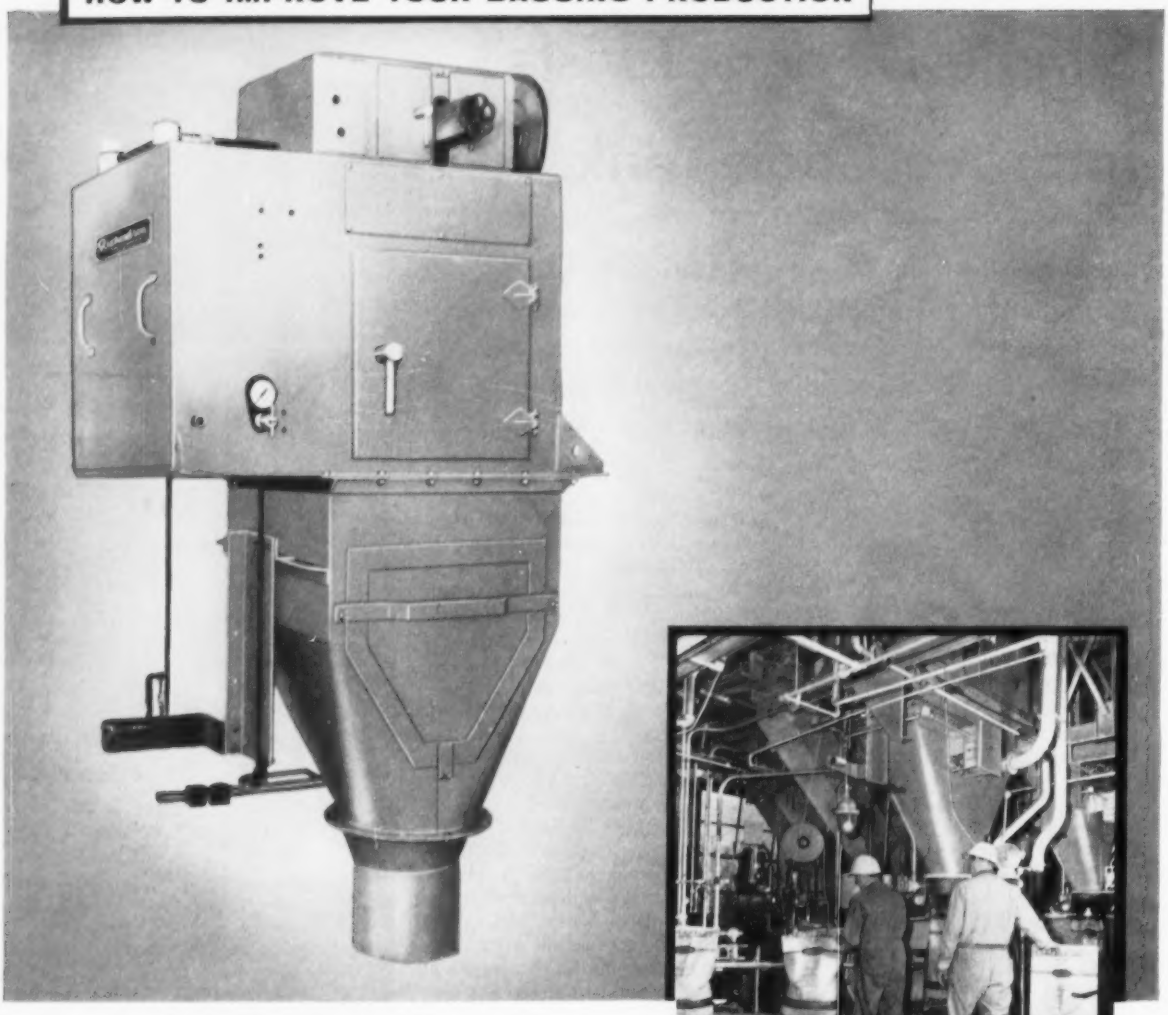


2 TANK COVER's drip apron gets concave edging to fit tank top.

3 HANDLE on cover (arrow) simplifies opening. Tank has sanitary tubular type legs.

4 INSTRUMENT BULB is set in corner (arrow) and is protected by overlying perforated false bottom.

HOW TO IMPROVE YOUR BAGGING PRODUCTION



Richardson Bagging Scales

give faster speeds with closer accuracies

Efficient and reliable bagging scales are the answer to today's need for faster production and lower per unit cost. Richardson Scales meet these requirements. And you avoid inaccuracies of underweights and overweights even at high bagging speeds. With over 55 years of experience in materials handling by weight, Richardson produces the highest quality bagging scales to provide stepped-up operations at lowest over-all cost. Simplicity of design and sturdiness of construction assure long life and dependability.

Richardson Bagging Scales are available in many models for many types of materials handling in bagging ranges of 25-250 lbs. The E-50 illustrated is extremely versatile in bagging most types of materials at speeds up to twelve 100-lb. bags per minute and within an average accuracy of ± 1 to 2 oz. or better. Special scales for flour, sugar, rice, feed and chemicals are available. Low cost automatic proportioning systems and engineering service are Richardson specialties. Write today for details on Richardson Bagging Scales for the Food and Chemical Industries.

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inaccessible top and bottom coils. Spaces between coils are sufficient to allow a large-sized cleaning brush to pass through without hindrance. In addition, the coils are parellel-connected to minimize temperature drops along the length of tubes due to flowing condensate.

A thermo-fill system, consisting of a stainless steel bulb covered with bronze armor tubing, constitutes the temperature-sensing assembly for close control over the cook. This assembly is connected to a recorder-controller (Minneapolis-Honeywell), which activates a Series 400 valve (M-H) for steam-heat control.

This controller was selected for its comparatively good throttling characteristics, machined stem, deep stuffing box, and self-lubricated Teflon packing (which indicated a low maintenance cost). For protection, the bulb is located in one of the corners and beneath the perforated false bottom (Photo 4).

Pet cocks for line-condensate drainage were placed at base of legs of steam lines connecting to heater coils. In addition, provision was made for hand control of heater by fitting a by-pass valve around the automatic Series 400 valve. Recorder-controller was mounted on wall at side of cook tank.

Working Temperature Factors

In a performance test, temperature limits of 163 and 185F. were considered to represent the most likely operating-temperature range.

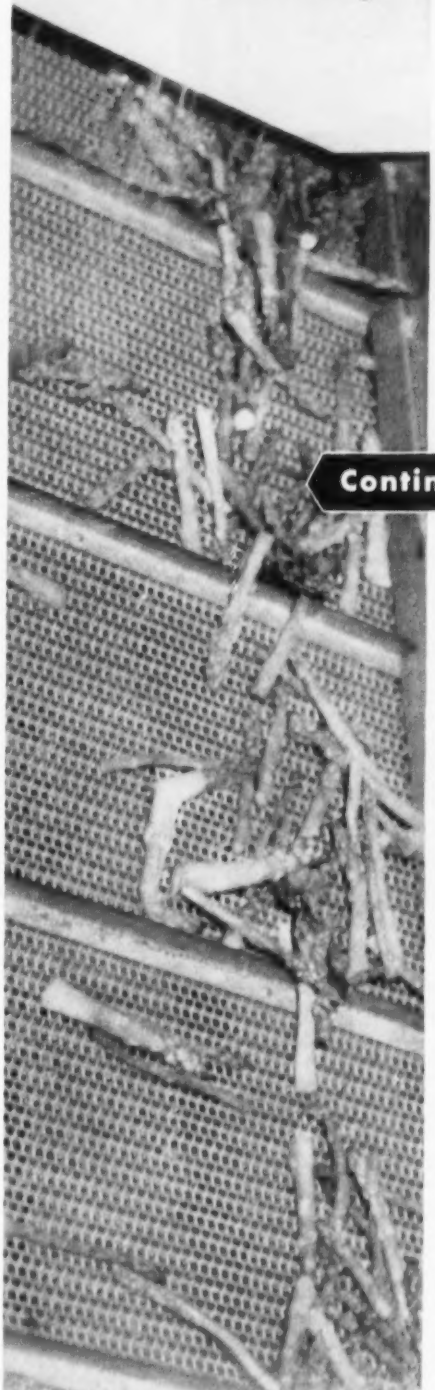
An arithmetic mean was calculated for each of these levels. It was based on a measurement made at the instant each level was reached, thus not allowing equalization with time. Deviations from the mean averaged 0.4 deg. in both cases.

In respect, furthermore, to the five temperature points (four corners and center of tank), maximum deviation of any one from its respective mean was 1 deg. at the lower limit (i.e., 163F.), and 2 deg. at the higher limit (185F.).

Actually, a cost reduction may be reported for this tank. Part of this saving may be credited to elimination of stainless steel angles, resulting not only in less expense of materials but also a saving of the labor commonly required for welding and then finishing or "buffing" the welded joints.

The above article is based on Journal Paper No. 142, American Meat Institute Foundation. —End

HOW *Cambridge* Wire Mesh Belts reduce food processing costs



By providing continuous movement through all phases of food processing, wire mesh conveyor belts minimize manual handling, enhance quality and uniformity, improve sanitation and reduce damage. Meat, poultry, candy, baked goods, fruit and produce can be frozen, canned, fresh-packed or baked faster and easier on moving belts. EXAMPLE:

Continuous Washing

MOVING BELT carries asparagus continuously from wash tank through a spray rinse on the way to the blancher.

SPECIAL CROSS FLIGHTS pick up stalks from surface of the wash water, hold them on the belt during inclined travel.

OPEN MESH permits rapid drainage of wash water, increases uniformity by providing free circulation of steam in blanching and of sub-zero air in freezing tunnel, allows small waste particles to fall through so they won't contaminate belt or product.

RUSTPROOF ALL-METAL BELT provides long life, is impervious to damage from process solutions, heat and cold . . . has no odor . . . will not contaminate product.

Cambridge Wire Mesh Conveyor Belts are made in any size, mesh or weave, from any metal or alloy, and can be used under a wide range of conditions . . . hot or cold, wet or dry. Call your Cambridge Field Engineer to discuss how you can cut food processing costs with continuous processing on woven wire conveyor belts. Look for his 'phone number under "Belting, Mechanical" in the Yellow Pages or write for FREE 130-PAGE REFERENCE MANUAL.

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DAY "AC" Dust Filter and DAY Dual-Clone in the Stauffer Chemical Company fertilizer plant located in Tacoma, Washington

THIS DAY DUST CONTROL EQUIPMENT CERTAINLY SOLVED OUR DUST PROBLEM!

DAY Supplies Dust Control Equipment for Practically Any Industrial Need

The DAY "AC" dust filter* (shown above) captures submicron particles with 99.99+% filtering efficiency. This filter is used in many plants throughout the United States and Canada and handles a wide variety of materials including aluminum, cement, chemical, food, pharmaceutical, porcelain, radioactive, rubber and many other dusts.

The DAY Dual-Clone (above-right) has low horsepower requirements and operates with unusually low back pressure. It requires no maintenance.

For latest information about DAY "AC" and Dual-Clone equipment write toDAY for Bulletins 559 and 49-DC.

*Licensed by H. J. Hersey, Jr.

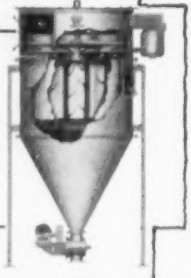
DAY TYPE "HV" CYCLONIC SEPARATOR

A heavy gauge, welded, high efficiency cyclonic separator. The DAY "HV" has a wide range of applications. It handles abrasive or high temperature dust laden air and requires no maintenance because it has no moving parts. Available for pressure or vacuum operation. For additional information write for Bulletin 576.

DAY TYPE "RJ" DUST FILTER*

A packaged dust filter shipped completely assembled and ready to run. Provides high performance, top efficiency dust control at low cost. High air-to-cloth ratios give extra air handling capacity in small area. Furnished with or without dust fan and discharge equipment. For latest information write toDAY for Bulletin 560.

*Hersey and DAY patents applied for.



DAY TYPE "G" EXHAUST FANS

High air delivery per horsepower required. These fans are designed specifically for dust control applications. Each fan is statically and dynamically balanced before shipment. For further information write toDAY for Bulletin 471.

DAY SINCE 1881

The DAY Company

DAY SINCE 1881

SOLD in UNITED STATES by
The DAY SALES Company
817 Third Ave. N.E., Minneapolis 13, Minn.

MADE and SOLD in CANADA by
The DAY Company of Canada. Ltd.
P.O. Box 70D, Fort William, Ontario

Representatives in Principal Cities

STOP **AIR POLLUTION with DAY DUST CONTROL**

New Product and Process

—*Continued from page 71*

The setting on the wet bulb instruments regulates dampers that control the relative volumes of fresh and re-circulated air drawn through by the fans. The dry bulb units regulate the valves of each tunnel's 4-row steam coils.

Tunnel Operations

Here is the tunnel-feed routine: One rack goes into Tunnels 1, 2, or 3 at 25-min. intervals. Racks discharged from these tunnels are then finish-dried in Tunnel 4.

Hydraulic rams move the loaded racks through the tunnels. The operator merely positions an incoming rack before the ram, which pushes the entire tunnel-load forward, one rack-space. When fully charged, one rack of dehydrated product is simultaneously discharged when a rack of raw material is moved into the tunnel's feed end. The discharged rack then proceeds into Tunnel 4.

Temperature and humidity in the milling-packaging room is critical because the product has now been dehydrated from 15-25% to below 5% moisture content. Therefore, hot product from the finishing tunnel is first cooled to about 70F., then moved into this room.

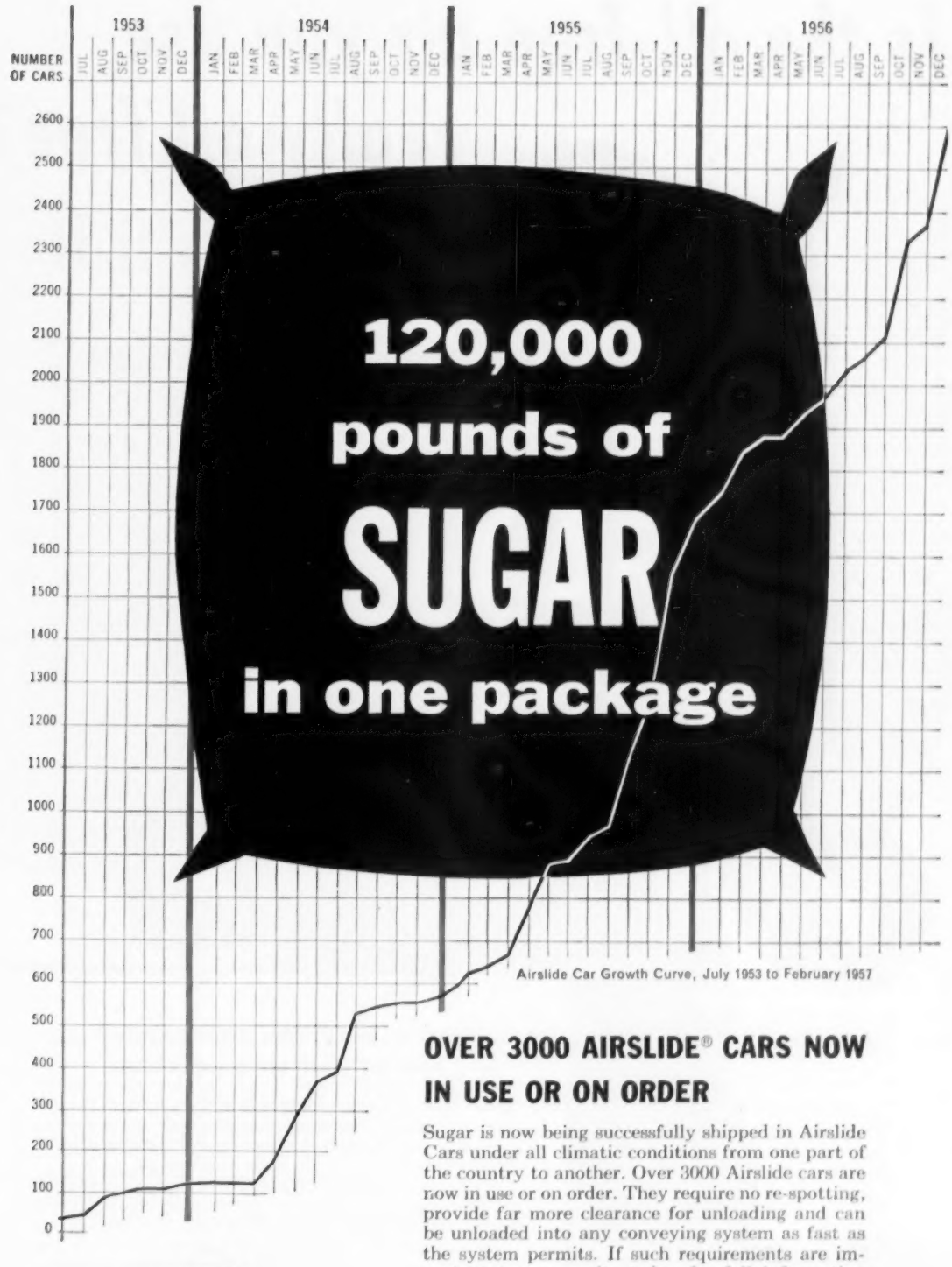
Trays are manually dumped onto a conveyor leading to the prebreaker. Then empty trays move by chain conveyor under a helical screw that scalps any remaining product from them.

Product from the prebreaker is bucket-elevated to a cereal mill, and after milling is chuted to a separator and sized by a 6-mesh screen. Oversize particles are recirculated to the prebreaker to go through again.

From the separator, the finished product is chuted to the packaging station. Magnetic cleaners, located at mill inlet and at packaging chute, trap metals from product flow.

Polyethylene bags are used as protective liners for the corrugated shipping cases. After filling with 50 lb. of date granules, the bags are closed and the case flaps sealed.

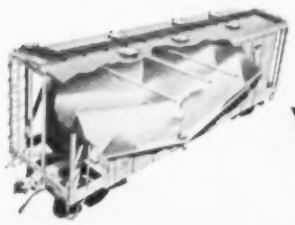
Cases are filled on a scale equipped with a sensitive switch, located at the 45-lb. point. This sounds an alarm to warn the filler operator that the package is nearly filled. A dust collector, located at the filler discharge, collects fines and draws them to a cyclone. After filling, cases are roller-conveyed to a second scale for final check-weighing. —*End*



Airslide Car Growth Curve, July 1953 to February 1957

OVER 3000 AIRSLIDE® CARS NOW IN USE OR ON ORDER

Sugar is now being successfully shipped in Airslide Cars under all climatic conditions from one part of the country to another. Over 3000 Airslide cars are now in use or on order. They require no re-spotting, provide far more clearance for unloading and can be unloaded into any conveying system as fast as the system permits. If such requirements are important to you, write today for full information about General American's Airslide car.



CLEAN INTERIOR DESIGN. *All-welded construction provides maximum sanitation and minimum product retention. All hatches and outlets provide a hermetic seal, assuring complete in-transit protection.*

AIRSLIDE GENERAL AMERICAN TRADE MARK

It Pays To Plan With General American

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street • Chicago 90, Illinois • Service Offices In Principal Cities • Service Plants Throughout The Country

For more data, circle this page number on card at back →

Is the oil-free air you use really oil free?

Let us make this sterile cotton test on your air compressors

This Gardner-Denver fieldman is showing you the results of two air discharge tests made on two air compressors—one of them the *new* Gardner-Denver oil-free Model CACB.

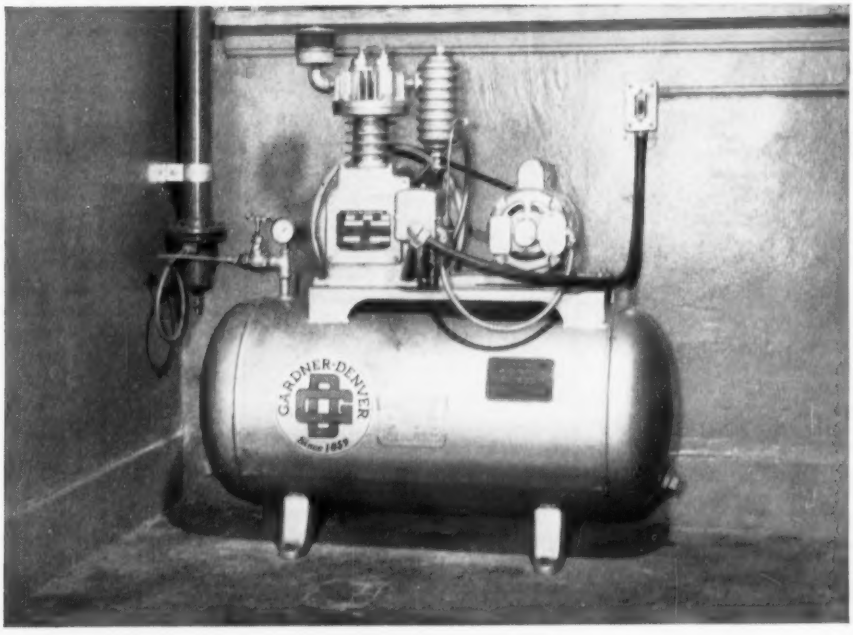
The cotton filter on your left, upon removal from the air discharge pipe of the standard compressor, showed discolorations made by oil stains and other impurities.

The cotton filter on your right was removed from the discharge pipe of the new CACB compressor—*entirely free from oil vapor and other foreign matter.*

If you must have pure, oil-free air for instrument controls, food processing, brewing, distilling, or the manufacture of plastics and other products, our fieldmen will come on call to test your compressors for oil contamination. Write Gardner-Denver Company, Quincy, Ill.

← For more data, circle this page number on card at back

It's oil-free . . .
if it's from the new CACB!



Another example of Gardner-Denver Engineering Foresight . . . oil-free air from a small compressor

Now, for the first time, oil-free air is available from a small, space-saving compressor —base or tank mounted—for instrument control and other small-capacity uses.

The heart of the new Gardner-Denver CACB oil-free compressor is the carbon parts which require no oil or water lubrication in the cylinder.

The CACB is a single-stage, air-cooled compressor that supplies 4 to 5 cubic feet of oil-free air per minute. It is suitable for discharge pressures of 40 to 100 psi. Automatic start and stop controls are supplied as needed. In addition, it has the same quality construction features of all Gardner-Denver tank-mounted compressors; for example, an alloy crankshaft with self-lubricating main bearings on *both sides* of the throw.

Write for complete details

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario

For more data, circle this page number on card at back →

USCOWELD PLASTIC PIPE FITTINGS

Greater Joint Strength—Faster Insertion—Thanks to

THE ONLY SOLVENT-WELD FITTING WITH AN INTERFERENCE FIT!

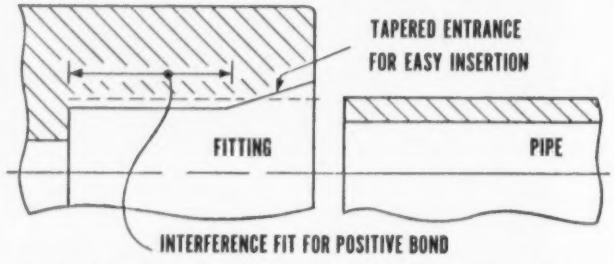
To get maximum joint strength, interference fit is a must! UscoWeld fittings are designed to provide at least a .005 inch *interference fit*. And UscoWeld fittings are a cinch to install because of a specially designed *tapered entrance socket*. U. S. Rubber has developed the unique UscoWeld fitting of the same tough, lightweight, corrosion-resistant thermoplastic as famous Uscolite® CP plastic pipe.

All UscoWeld fittings can safely handle the pressures recommended for the corresponding size of extra-heavy Uscolite pipe. Maximum recommended operating temperature is 170°F. Pipe can be cut to exact length, is easily installed in close quarters.

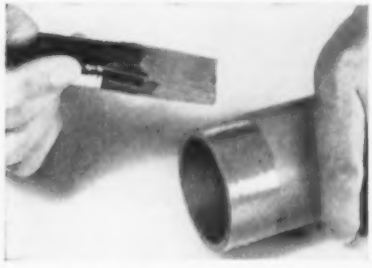
Obtainable at any of our 28 District Sales Offices, at selected distributors, or write us at Rockefeller Center, New York 20, N. Y.

In Canada, Dominion Rubber Co., Ltd.

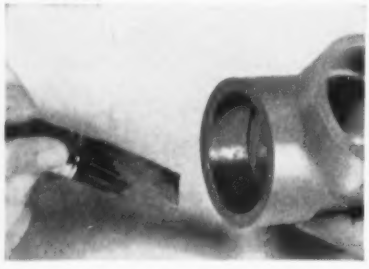
THE USCOWELD PRINCIPLE



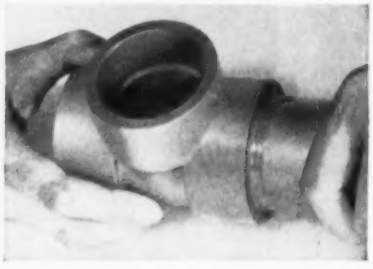
By combining tapered entrance socket and a .005 inch interference fit—even when the pipe is at the small limit of the diameter tolerance and the fitting at the large limit of its diameter tolerance—UscoWeld is easily installed, and the strongest solvent-weld joint available.



Apply Uscolite CP cement to the outside area of the pipe that is to be in contact with the socket.



Next apply cement uniformly to entire inside area of *tapered entrance* socket.



While both cemented surfaces are still wet, insert pipe in fitting and push until pipe bottoms against shoulder in the fitting.

ADVANTAGES

- fast, easy to assemble—tapered entrance provides easy insertion of pipe
- strong joint—interference fit provides for optimum fusion of pipe and fitting into homogeneous mass; joint strength not dependent on cement alone
- automatic alignment of pipe and fittings
- chemical resistance of the UscoWeld joint is the same as for Uscolite pipe
- UscoWeld takes maximum advantage of the inherent "solvent-weldability" of plastic pipe and fittings
- no threading required—just cut pipe square
- not necessary to allow for thread make-up variation—pipe can be cut to exact lengths
- easy to install in close quarters
- resists fatigue due to vibration or thermal stresses by elimination of stress concentration at thread roots.

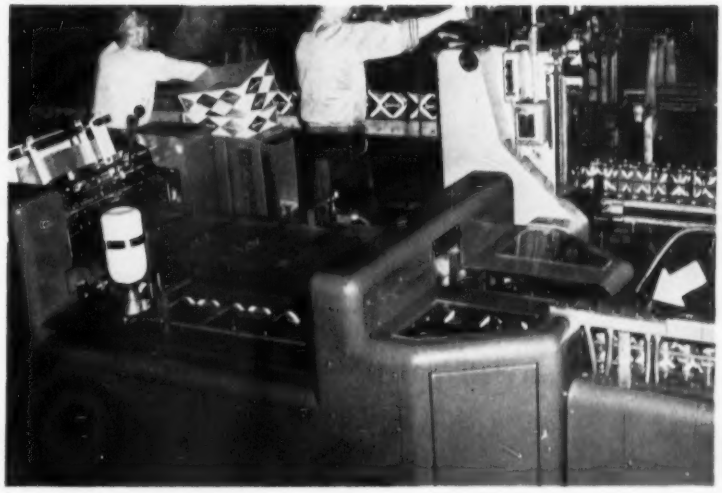
Mechanical Goods Division

United States Rubber

← For more data, circle this page number on card at back

Compact Machine Ups Multipacking Speed

New unit operates with reverse feed technique . . . Handles both crown and flat-top cans . . . Turns out 120 cartons/min.



LATEST MULTI-CARTONER shuts down automatically and flashes signal lights (arrow) if cans jam or cartons miss-feed. Infeed conveyor (right) measures 57x24 in., and separates containers into double line. Carrier moves carton blanks to machine intake (right), where they are folded down over cans.

FE STAFF

GROWING AWARENESS among processors that consumers are really eager for multipacked foods has led to a veritable scramble for simpler and faster equipment to form these carry-cartons.

Now, a compact new machine, measuring only 92x50 in., shows great promise for all operators interested in automatic, high-speed packaging of cans.

Secret of its operation is a reversed carton-feed—whereby the multi-pack blank is fed from a hopper at the discharge end of the machine, and travels to the opposite end before being folded down over the tops of the grouped cans. It handles cone-top as well as flat-top containers.

Also, it would seem that with very little modification the unit could be applied to multi-packaging of bottles —forming a carry-home carton distinctly different from those on the market today.

The Jak-Et-Pak (supplied by Robert Gair Div., Continental Can Co.) takes cans from 2⅜ to 7¾ in. high, and from 2¼ to 3¾ in. dia. It turns out more than 120 packs/min., its speed being governed by the can size and grouping.

Can, Blank Feeds Detailed

While change parts are necessary to switch the machine to handle cans of different diameters, it is readily adjustable for height—a strong advantage to brewers (for example) who package both 12 and 16 oz. sizes.

In fact, the very first machine has been recently leased to American Brewery, Inc., Baltimore, for six-packing beer.

Here, cans enter unit from the capper on a flat-chain belt. They are immediately divided into two lines. Positive-acting cam arms further separate the containers into groups of three on each track. Side chains equipped with dogs move in, grip cans, and push them forward over a skip plate. Then chain-mounted bars rise above the machine bed and carry the cans through the carton operation.

Meanwhile, a multi-pack blank (in a hopper at the opposite end of the machine) is pulled down from its stack by six vacuum cups. Dogs hold and raise the rest of the stack to guard against double-feed.

Knurled rollers pull blank from stack and drop it upside down between double sets of dogs, mounted on a dual, center chain.

The blank passes under a single, wheel-type glue roller that applies a band of cold resin-type adhesive to one end. The remainder of the trip toward the end of the machine allows this glue time to become tacky.

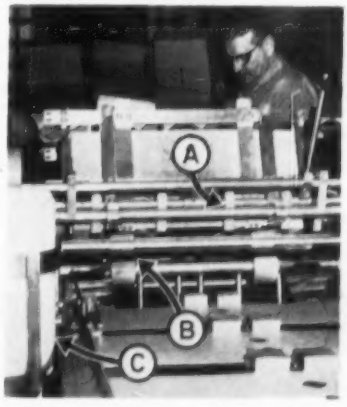
At the rear of the unit, chains double under. This reverses the carton, putting it right-side up and in folding position right over the cans.

Simple Device Folds Carton

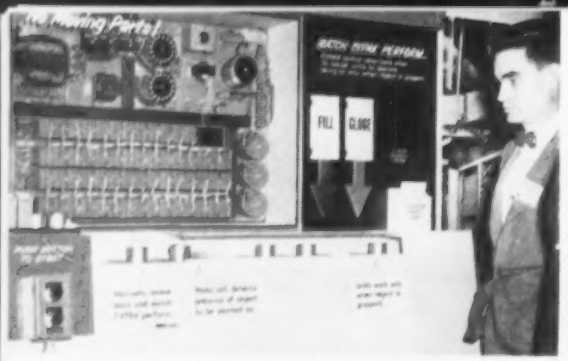
A curved guide bends carton sides down around the six cans, and a plow bends the bottom flaps up under the skip plate. As the unit is conveyed off the plate, cans settle on the carton and two, rotary prongs rise and travel a few inches with the container. These lock the bottom flaps. The glue bond gives a further seal for shipping protection.

Another skip plate permits holding bars to drop below the machine bed and return to starting point. Completed carton is ejected on a discharge belt.

The multi-pack carton, supplied to American by Robert Gair, is die-cut from 24-point white-lined kraft paper. Design (by Lippincott & Margulies) is letter-press printed in red and gold. —*End*



FOUR DOGS, as at (A), hold up carton stack while vacuum cups, as at (B), pull single blank down and feed it through rolls. Polyethylene bottle (C) provides non-breakable container for resin-type adhesive.



SEQUENCE CONTROLLER, with no moving parts or contacts, electronically actuates multiple operations in complex processing, packaging, and materials-handling systems. Its electronic 'memory' units and magnetic amplifiers are designed for split-second functioning for years without maintenance. Components are readily plugged in for various flexible arrangements.—Westinghouse Electric Co., Pittsburgh. (96A)

19 New Units

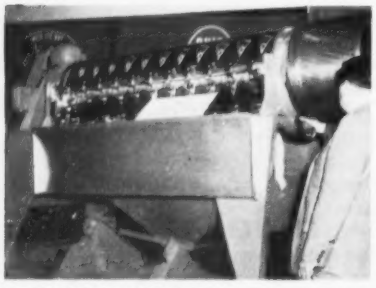
For 'Up-Front' Processors

'Do it better' equipment—specially designed for improved production control, filling, packaging, can making, sanitation, and materials handling—gets accent at Chicago canners show

4 Advanced Processing Units

VACUUM PROCESSOR continuously deaerates items from comminutor. Float in unit's stainless tank controls flow into comminutor. Pushbuttons operate mill and accessories.—W. J. Fitzpatrick Co., Chicago. (97B)

NEW MUSHROOM TRIMMER features electronic control that helps reduce waste, also minimizes labor in operation. Machine's root-cutting knife is automatically positioned for varying stem lengths.—A. K. Robbins & Co., Baltimore. (96C)

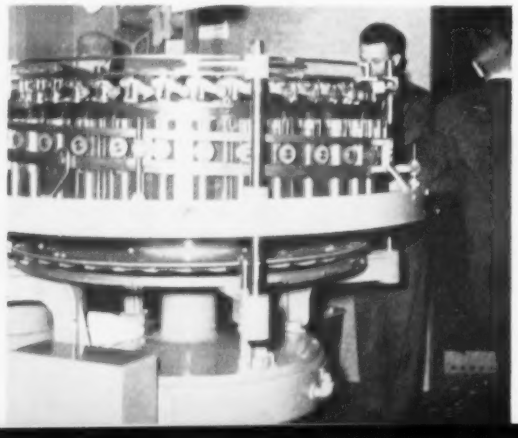


NEW BEAN SNIPPER employs oscillating knife mechanism that makes for uniform wear of the long-life stainless drum. Chevron-shaped blades, individually spring-mounted, are adjustable for proper tension. A safety-release prevents knife damage by hard foreign objects. Automatic re-positioning of cutters offers optimum snipping.—Food Mach'y & Chemical Corp., San Jose, Calif. (96D)

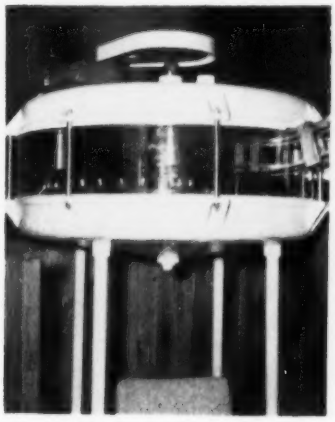
2 Latest Filling Machines

FREE-FLOW FILLER operates at speeds of 30 to 500 containers per min.; depending on dia. of can or jar openings. Products like cherries, olives, and pickles are gravity-fed over cone into containers moving below periphery on vibrating conveyor. A rotary brush levels off product in filled containers.—Berlin Chapman Co., Berlin, Wis. (96E)

CAN FILLER is 36-station piston type that will put through 1,000 containers per min. Easy to clean and maintain, unit adapts for handling wide variety of liquid and semi-liquid products. Fill accuracy is controlled by self-cleaning, plunger-type valve featuring positive leakage control.—W. F. & John Barnes Co., Rockford, Ill. (96F)

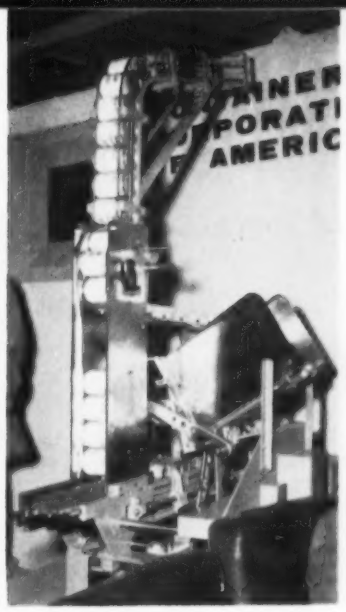


5 New Packaging Units



MAGNETIC CAN WASHER is enclosed type that operates at 1,800 cpm. Water is jetted inside upside-down cans as stainless disk rotates them. Magnetic field holds cans to disk. Different can sizes can be handled.—Barker Co., Tampa, Fla. (97A)

THIS CLUSTER-CARTONER packs 2-6 cans of any size in single-file arrangement, or 4-12 units in double-line layout. Speed: 30 cpm. Machine is small and of low cost. Quickly adjustable, it requires neither glue nor staples.—Atlanta (Ga.) Paper Co. (97B)



MULTI-PACKAGER turns out up to 60 cartons per min., each holding 2, 3, or 4 cans single-line. Unit is easily adjustable to pack cans of different heights or diameters, also cartons with varying handle-tab styles.—Container Corp. of America, Phila. (97C)

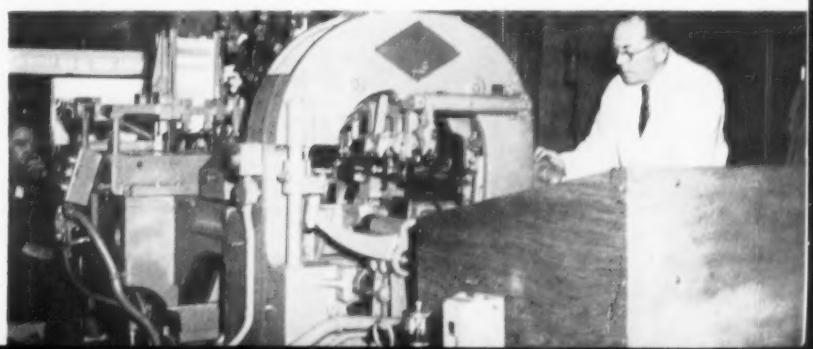
SPECIAL CONTAINER features: Controlled gluing, tear-strip for easy opening, lock-back flaps for simplifying hand packing, non-skid surfacing embossed on top and bottom, and squared-up, strong lock joints.—Kieckhefer Container Co., Camden, N. J. (97D)

GLUE LABELER takes 75- to 90 gal. containers per min. Suction extracts labels from magazine. Circulating system eliminates both accumulation of glue behind scraper bar and streaky applications due to dirt or hardening.—New Jersey Machine Corp., Hoboken, N. J. (97E)

NEW TINPLATE SLITTER is high-speed 2-unit machine with common drive from gearhead motor. Table retraction gives quick access of first cutters, and entire bearing units are readily removable for check. Unit trims and squares-up tinplate, also slits out body blanks. Speed: 30-70 sheets/min.—E. W. Bliss Co., Canton, Ohio. (97F)

High-Speed Tinplate Slitter, Can Body Maker

CAN BODY MAKER utilizes central drive shaft for all crank-actuated motions, which cuts maintenance and shutdown time. Automatic stops promote safety. Drive on body maker and soldering machine is designed so former immediately stops in event of a jam, while latter runs until manually stopped. In event of jam on soldering unit, both units stop. Machine is specially patterned to simplify training of operating personnel.—Baldwin-Lima-Hamilton Corp., Hamilton, Ohio. (97G)



how TITANIUM

can tame the corrosive pickle...

Processors of pickles, catsup, or other foods with a high chloride content, know how quickly they attack kettles and other equipment of ordinary metals. Corrosion causes frequent replacements and troublesome shutdowns.

Titanium can be the remedy. For REM-CRU titanium is unaffected by chlorides and most organic products. It is completely impervious to salt water or brines which normally cause pitting in other corrosion-resistant structural metals.

What's more, titanium can not contaminate food products . . . adds no unwanted 'metal-taste.' And titanium's light weight—it's as strong as steel, but 40% lighter—makes equipment easier to handle.

REM-CRU titanium is now available for *prompt* delivery in most sizes and types. Why not let a REM-CRU engineer help you decide how to put this versatile metal to best use in your plant?

Write Dept. F-4 for the Rem-Cru Review—a free periodical presenting the latest data on titanium.

REM-CRU TITANIUM

World's Most Versatile Metal

MIDLAND, PENNSYLVANIA

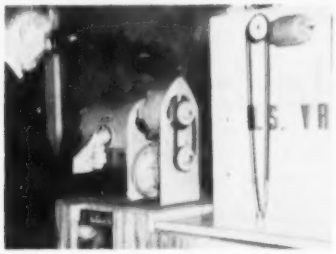
Sales Offices: 3338 South Malt Avenue, Los Angeles 22, California • 4501 W. Cortland Street, Chicago 39, Illinois • 405 Lexington Avenue, New York 17, N. Y.

THIS ROTARY JET automatically cleans tank trucks, operates with pressure unit and controls. Tanks are pre-rinsed, cleaned with hot water and detergent, then cold-water rinsed. Jet is inserted in tank manhole.—Sellers Injector Corp., Phila. (99A)

FEEDER & CONTROL UNIT is compact device for automatically treating water in cooling canals, thus prevents growth of bacteria and algae. Treating agent employed is non-corrosive Diversol CX.—Exhibitor: Diversey Corp., Chicago. (99B)

Versatile Conveyor Motor, Pump, Lab Steam Generator

OSCILLATING CONVEYOR is readily adaptable as a picking table. And easy-to-clean unit accumulates products without overflow during operational delays. Has no return leg. Items won't dribble onto floor.—Link-Belt Co., Chicago. (99C)



DRIVE SYSTEM employs a.c. current devices to synchronize vari-speed multiple drives. Speeds are adjusted instantaneously and simultaneously from one location. No "lead" motor required.—U. S. Electric Motors, Inc., Milford, Conn. (99D)

NEW PUMP, designed for easier sanitation and maintenance is disassembled, cleaned, and reassembled in minutes without hammers or screw drivers. No hard-to-get-at corners or grooves.—Waukesha Foundry Co., Waukesha, Wis. (99E)

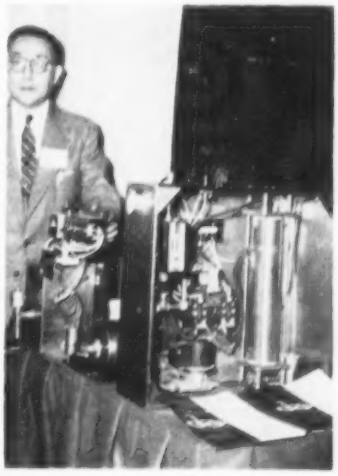
Also Spotlighted

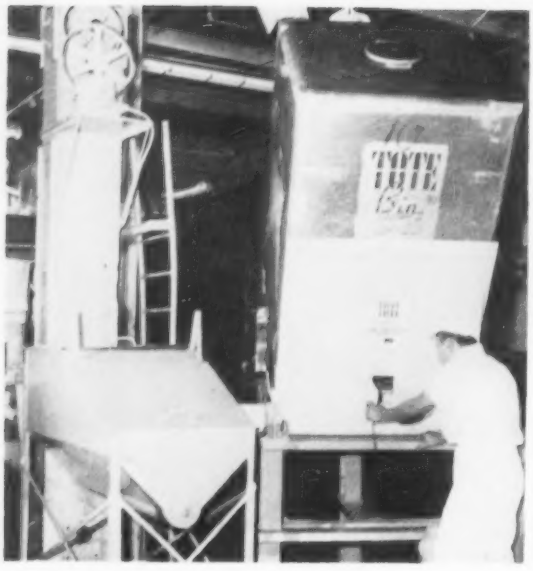
—at the show were an improved sanitary blancher and a production-line consistency controller. These are detailed in this month's New Equipment section (pages 213 and 215, respectively).

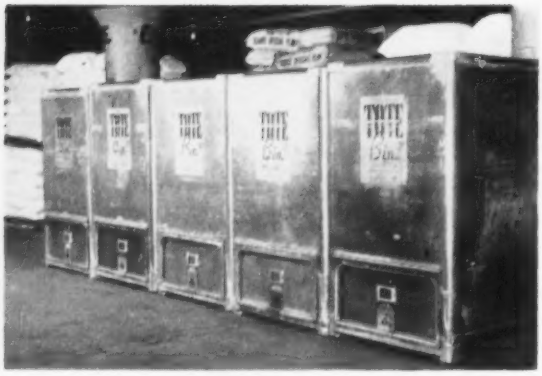
On view, too, were the following late-model units: Tumble-type filler (Solbern Mfg. Co., Brooklyn, N. Y.—covered in FE Mar. '57, p. 191); bulk-salting device (Frank Hamachek Machine Co., Kewaunee, Wis.—Feb. '57, p. 179); electronic brine dispenser (International Salt Co., Scranton, Pa.—Aug. '56, p. 115); and a vertical-screw juice press (Food Mach'y & Chemical Corp., San Jose, Calif.—July '56, p. 109).

INSTANTANEOUS GENERATOR delivers continuous flow of steam at 30 psi. after less than 2-min. warmup. For laboratories, it operates on carbon-heater principle, and compensates for different water hardnesses. Unit can't lime up, won't burn out, has no moving parts, and is thrifty in current consumption.—The Insinger Machine Co., Phila. (99F)

For further data on units circle key number on Reader Service Card in back of book.







IN STORAGE AREA, bins save 15 to 30% space. Flour in bags (rear) will soon be handled in bins.

TILTED BIN discharges sugar into screw conveyor at Burry plant. Close to 2 tons of sugar are carried by each bin (74 cu. ft.).

Wins 6 big benefits by bulk handling in

Portable Ingredient Bins

Less labor, faster transfers spell out notable savings all along the line for bakery operators who move sugar and flour in versatile aluminum containers . . . Tilt-discharge equipment, also sifter-collector units contribute

BULK HANDLING in portable bins continues its fast rise, spurred by the mounting confirmations of its economies.

Pointed examples of "bin-way" boosts in working efficiency, coupled with notable dollar improvements, are now offered by two leading baking plants—Burry Biscuit Corp., Elizabeth, N. J., and Loblaw's Bakery, Buffalo, N. Y.

Burry figures that savings running between $15,000 and $20,000 are being realized each year through its switch from the former bags over to Tote Bins in the handling of sugar and flour.

The plant cites six advantages for the bin technique:

- **Labor required for unloading, loading, storing, transporting, and emptying bags has been saved.**
- **Bag costs (12-14¢ each) are no longer entailed, amounting to a daily saving ranging $46-$54.**
- **Losses from pilferage, spillage, and contamination have been cut to a minimum.**
- **The bins offer more flexibility, are easier and speedier to move than the numerous bags of equivalent content.**
- **The hermetic-sealing advantage promotes product quality by protecting the ingredients.**
- **The bins contribute to plant sanitation, boosting worker morale.**

This bakery made the shift four years ago when management became impressed with the potential benefits of portable bin handling. In 1953, Tote System, Inc., installed 25 aluminum Tote Bins, each of which holds almost 2 tons. Also put in was a Tote Tilt discharge mechanism.

Used as shippers, the sturdy containers may, as noted, be hermetically sealed. Their construction allows handling by fork-lift trucks. And they can be transported in any flat-bed conveyance. Some railroads run special bin cars, with attractive rates quoted.

The rectangular shape and special legs make the bins ideal storage containers, since they may be stacked atop one another to utilize all available space. At Burry's, Tote Bins have chalked up a 15% saving in warehouse space as compared with palleted bags.

Discharging the Bins

The Tote Tilt eliminates spillage when the bin is used as a discharge container. The bins unload themselves when placed at a 45 deg. angle. A screw conveyor carries the ingredient through a surge hopper, bucket elevator, and pulverizer to the baking area.

The Elizabeth bakery purchases its sugar from New York City refineries, getting a bulk discount by transporting the ingredient in eleven Tote Bins on a flat bed truck. One man loads a truck in 15 min., whereas the former bag loading took two men

No Spoilage Bacteria
IN THIS SHIPMENT

it's filtered with CELITE

Whether you are refining sugar or buying it for use in your process operations, you can be sure that liquid sugar is free of thermophilic bacteria when it is filtered with Celite*. Efficient, economical Celite filtration delivers brilliantly clear liquid sugar that will remain positively pure as long as it is protected from recontamination by spores in the surrounding air.

Celite is also ideal for filtering other food products such as syrups, jellies, beer and wine. Composed of microscopic particles of pure inert diatomaceous silica, Celite provides fast, economical clarification . . . never affects the most delicate flavors.

And with Celite you get important advantages over other diatomites. Its lower wet density means greater filter surface coverage. Its high uniformity means more consistent results. For more information on how Celite filtration helps the food industry make better products at lower cost, call your near-by Celite engineer or write Johns-Manville, Box 14, New York 16, N.Y. In Canada, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

Johns-Manville CELITE
diatomite filter aids

JOHNS-MANVILLE PRODUCTS

PENNSYLVANIA PLANT LOCATION DATA SERVICE

Special reports and tabulations, tailored to stated location requirements, will be prepared upon request by our engineering and economics staff from central data, files and direct sources, covering:

LABOR—Availability, skills, rates, surplus areas.

MARKETS—Consumer, industrial product, state, regional.

TRANSPORTATION—Water, rail, truck, air transit time, costs.

FINANCING—Community-state industrial building program, lease-purchase, commercial credit.

BUILDINGS—Availability, sizes, location, descriptions.

SITES—Acreage, topography, utility services, photos, maps, industrial districts.

MATERIALS—Metals, industrial chemicals, wood, textiles, farm products.

MINERALS—Location, reserves, potentials, analyses.

WATER—Quantitative, qualitative analyses.

POWER—Capacity, network, industrial service, costs.

FUEL—Coal, oil, natural gas service, costs.

ENGINEERING—Schools, enrollments, specialization, research laboratories, services.

TAXES—Inter-state and community comparisons, assessment ratios, millages, corporate.

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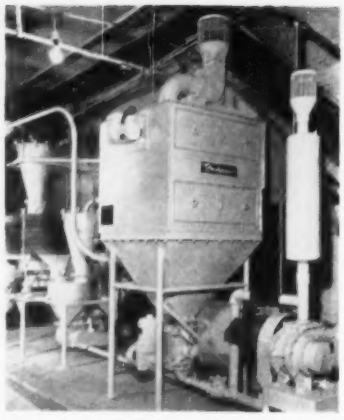
Industrial Representatives Available For Inspection Tours, Conferences And Consultations

For free copy of "Plant Location Services" booklet, or for details on how this PENNSYLVANIA PLAN CAN provide 100% Financing for your new plant, write or call:

PENNSYLVANIA DEPARTMENT OF COMMERCE
Main Capitol Building, 499 State Street
Harrisburg, Pennsylvania
Phone: CEdar 4-2912



PNEUMATIC SIFTER and dust collecting units (above) are employed at Loblaw plant, where enclosed flour handling system utilizes efficient bin-feeding arrangements.

2 hr. This time and labor saving is duplicated when the sugar is unloaded at the plant.

Present Burry plans call for the installation of 100 more Tote Bins for flour handling. An annual saving of $60,000 has been forecast here. Two additional tilt units will also be added to keep flour flowing constantly into the baking operation.

Eight Airslide bulk hopper cars will be used. These will bring flour to the bakery siding, where a conveying system will deliver it to two bins at a time. As pairs of bins fill up, an automatic cut-off will shift the incoming flour to the next empty bins in the receiving series. A Fuller pneumatic system will carry the flour from bins to process.

Other Food Applications For the Bulk Bins

Coffee	Vitamins
Instant coffee	Dessert powder
Liquid chocolate	Cereal products
Salt	Noodles
Dry Milk	Soybean meal

Fully-Enclosed System

These same benefits are profiting Loblaw's Bakery at Buffalo. Here, Tote Bins feed flour into a fully-enclosed pneumatic installation.

The bakery trucks from 20 to 30 bins of flour daily from mills relatively close to the plant. Each tractor-van unit carries 10 bins (loaded five long and two wide). Total payload is thus 30,000 lb. —*End*

Choosing a fluid mixer for **top performance**

You can get better mixing, and avoid many regrets, by asking yourself these five important questions before you buy a mixer for fluids:

1. *Can I be sure, in advance, that I'll get the uniformity I want, as fast as I want it?* You can—when you mix with LIGHTNIN Mixers. Every LIGHTNIN is guaranteed, unconditionally, to do the job you expect it to do.

2. *How can I get ready to meet a change in mixing requirements?* Simply buy with an eye to your future needs. One good way to keep your mixing operation flexible: use LIGHTNIN Portable Mixers. You can clamp them on any open tank; switch to a different vessel later and change shaft length and propeller size to meet the new requirements.

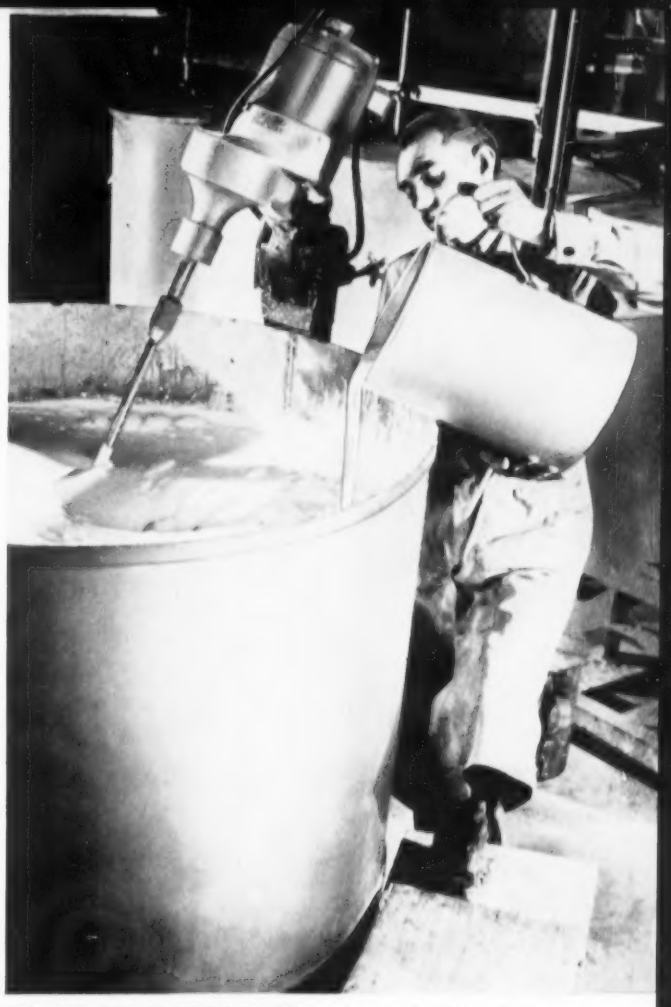
Caution: Be sure the mixer is sized big enough now to handle the toughest job you'll give it.

3. *Will I be able to get replacement parts in a hurry if I ever need them?* You avoid waiting for special parts when you use LIGHTNIN Mixers. They're built entirely of standard interchangeable components—always in stock, ready to ship on shortest notice.

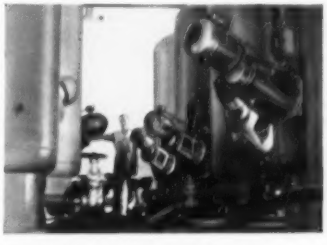
4. *Do some mixing jobs require special impellers?* Careful laboratory and field tests prove you can handle at least 95% of your fluid mixing needs with a standard 3-blade propeller (or standard flat-blade or curved-blade turbine, on large mixers). The exact balance of *flow* and *turbulence* you need is easily obtained by varying the size and speed of the impellers. You get guaranteed mixing results with lower-cost standard impellers when you mix with LIGHTNINS.

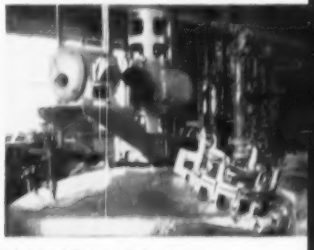
(You can, of course, get a wide choice of LIGHTNIN special impellers for those few mixing jobs requiring them.)

5. *Where can I get prompt, competent service on fluid mixing?* Just call your LIGHTNIN Mixer representative. He knows fluid mixing thoroughly—can quickly give you a *guaranteed* recommendation. And he's near you—look him up in Thomas' Register. Or write us direct.



GET RAPID DOUBLE-ACTION MIXING, or slow gentle stirring, in any open tank, with any of 30 LIGHTNIN Portable Mixers in sizes from ⅛ to 3 HP. No baffles are needed in the tank, and maintenance is extremely simple.





IN TANKS OF ANY SHAPE, you can get just-right mixing to bring your product quickly to uniformity. Propeller-type LIGHTNINS (left) are supplied for open or closed tanks. Turbine-type LIGHTNINs (right) are available in hundreds of power-speed combinations, with interchangeable speeds, in sizes from 1 to 500 HP.

WHAT SIZE AND TYPE of mixer do you need? Check here for latest bulletins giving full description, packed with helpful facts on mixing:

- ☐ Turbine, paddle, propeller types: top or bottom entering: 1 to 500 HP (B-102)
- ☐ Propeller types; top entering: ¼ to 3 HP (B-103)
- ☐ Portable: ⅛ to 3 HP (B-108)
- ☐ Side entering: 1 to 25 HP (B-104)
- ☐ Laboratory and small-batch production types (B-112)
- ☐ Condensed catalog showing all types (B-109)
- ☐ Quick-change rotary mechanical seals for pressure and vacuum mixing (B-111)
- ☐ Data sheet for figuring mixer requirements (B-107)

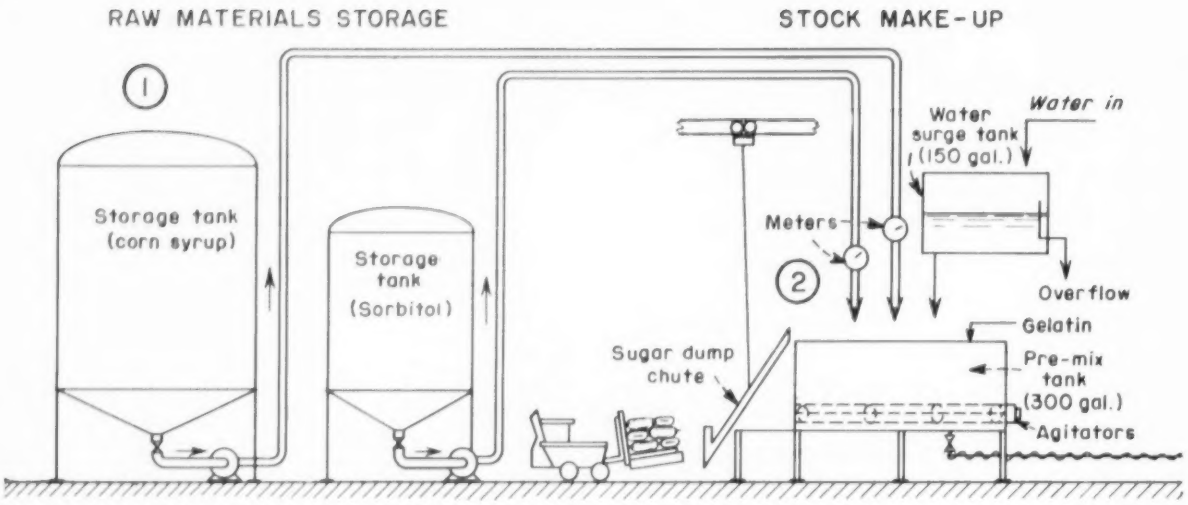
Check, clip, and mail with your name, title, company address to:

MIXING EQUIPMENT Co., Inc., 143-d Mt. Read Blvd., Rochester 11, N.Y.

In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Ave., Toronto 10, Ont.

Lightnin® Mixers™

MIXCO fluid mixing specialists



Marshmallow and Nougat—*Non-Stop*

Specially designed mixers accomplish the feat for this confectioner. And outputs soar to 3,600 lb. per hour.

TOP EFFICIENCY in sanitary, quality production of marshmallow and nougat confections starts with raw materials receiving.

At Paul F. Beich Co., Bloomington, Ill., corn syrup and sorbitol arrive in tank cars. Whipping agents (gelatin, sova albumen, and powdered egg whites) are received in drums. And sugar (100 lb. bags) comes on pallets.

Corn syrup is pumped into five, Tropolite-lined storage tanks that take the contents of 23 tank cars—Point (1) on accompanying foldout flowsheet. These tanks are located in 95-100F. rooms that keep syrup warm enough for easy pumping to the pre-mix station. Sorbitol is stored in a tank that holds the equivalent of 1¼ tank cars.

Speedy Marshmallow Output

Now to preparing the first aerated confections—chocolate-coated regular marshmallows and grained marshmallows (containing bananas, peanuts, etc.).

First, a stock solution (gelatin and sweetener) is made up in an enclosed, steam-coil-heated tank—Point (2). Preparation steps: A. Water is piped into a surge tank (mounted above the rectangular pre-mixer), with pre-set volume controlled by an overflow pipe; B. water is gravity-fed into pre-mixer; C. pre-weighed gelatin is introduced, blended for 5 min., then allowed to rest for 10 min. for water to soak up the gelatin; D. corn syrup and sorbitol are measured in with agitation; and E. sugar is added from 100-lb. bags.

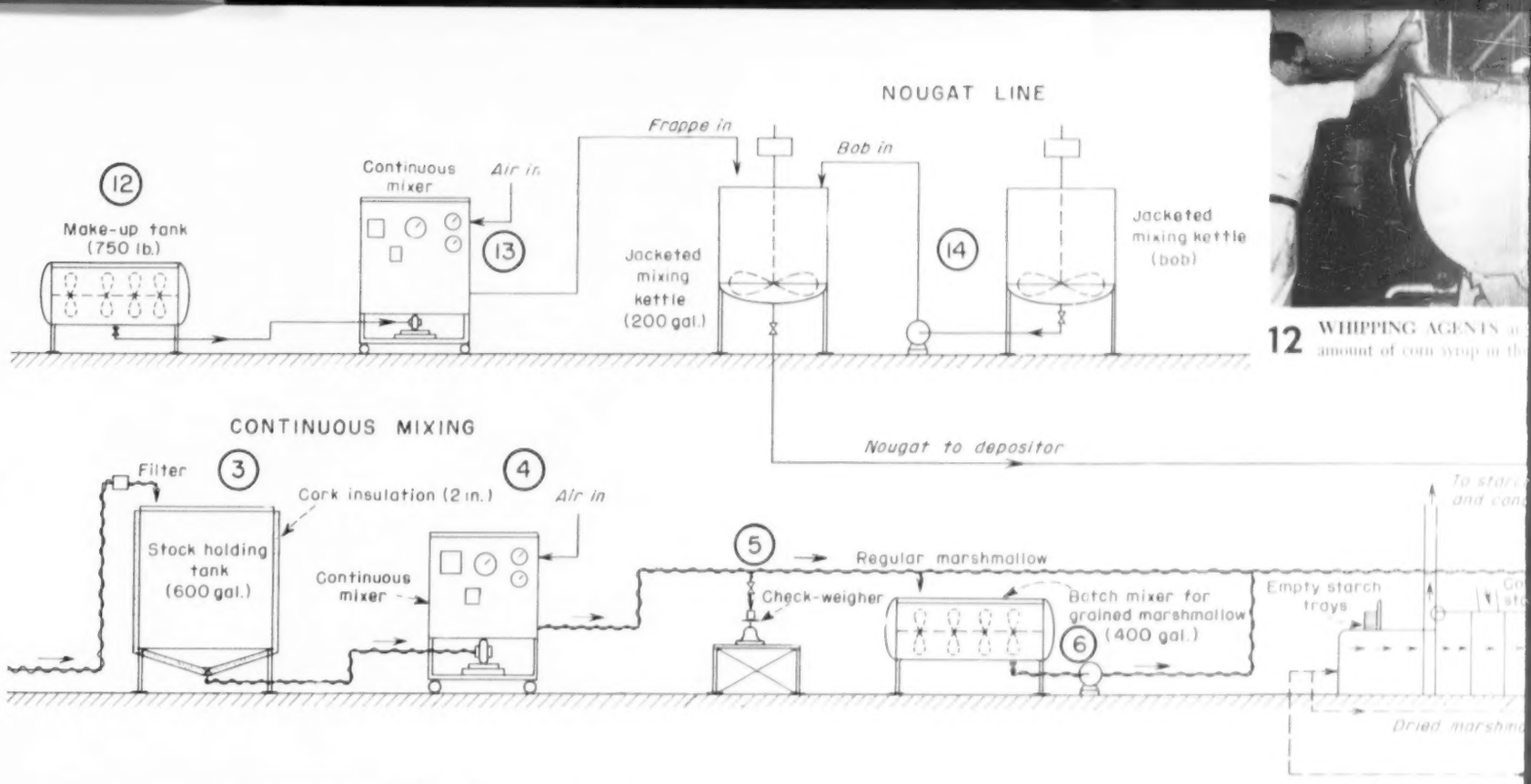
Mixing in the tank is facilitated by three 3-bladed horizontal agitators that rotate in the same direction at 250 rpm.

Blended stock (125-135F. for chocolate-coated, and 150F. for grained marshmallow) is now transferred by a positive-displacement pump to a stainless, enclosed holding tank—Point (3).

Pipe used for this movement is a 1¼-in.-dia. electrically heated line that prevents gelatin from setting. A built-in filter traps any lumps of gelatin. The holding tank has a three-bladed horizontal agitator (150 rpm.).

The marshmallow is continuously produced at a rate of up to 3,600 lb. per hr. Stock is fed from storage tank to continuous mixer (Whizolator) through another

UNFOLD HERE



12 WHIPPING AGENTS a amount of corn syrup in th

heated pipe line (4). Flow rate is controlled by a 1-hp. positive-displacement pump, hooked to a variable-speed drive and timer. Pump pushes a pre-set amount of marshmallow through mixer and via a 1¼-in. heated line to a jacketed beater (6) or a depositor (7).

Pump timer automatically stops flow when a pre-set amount of marshmallow has passed to beater or depositor.

In-pipe whipping of stock into marshmallow is accomplished in the continuous mixer in this manner:

Stock is "jetted" through a ¼-in. nozzle under 125-175 psi. into a short pipe line that contains pressurized air.

This pre-mixes stock. Next, air-stock mixture spouts against a fluted metal target, which atomizes and disperses the mix into a short, expanded mixing pipe. Atomizing and mixing is repeated in another pipe, then mixture proceeds through a ceramic diffusion sleeve that further disperses product.

In the heated line that leads to the depositor, marshmallow passes a take-off (5), equipped with a quick-acting valve that permits material to be drawn off for check-weighing.

Here, specific gravity (weight per gal.) of the marshmallow is measured, and air pressure to continuous mixer set accordingly.

Marshmallow is deposited into impressions formed in starch trays. Loaded trays are automatically stacked on skids in two rows of 30 trays each. Skids are then moved into a drying room (8) for overnight curing. Grained marshmallow is held at 85F. and 45% relative humidity, regular marshmallow at 68-70F.

In the morning, dried marshmallow is taken back to the depositor and screen-separated from the starch, which is reclaimed in a continuous dryer (Hulin). From here, the product is chuted through a rotary brush cleaner–Point (9)–that removes any clinging starch.

Grained marshmallows are packed 120 to the carton, or bulk-packed into 20- or 30-lb. cases.

Regular marshmallow centers proceed via a 32-in.-wide belt to a chocolate bottomer. Next, they may be topped with nuts or coconut. Finally, they pass through a chocolate enrober (10), a 65-ft. forced-air cooling tunnel, and are conveyed to four wrapping machines (Package Machinery Co.)–Point (11).

Separate Line for Nougat

Nougat bars are prepared separately from a frappe and a bob (syrup), which are blended to form the finished product.

Frappe is made from whipping agents such as egg, soya albumin, or milk protein–or combinations of these materials.

In solution or powder form, these are introduced into a batch mixer–Point (12). Here, the whipping agent is blended about 45 min. with a metered amount of corn syrup to form the pre-mix stock.

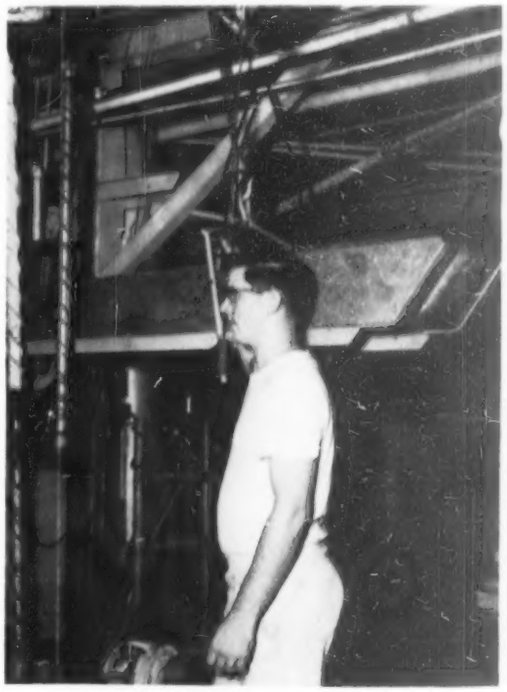
This material is timed through another continuous mixer (13) and is formed into a frappe that discharges into a jacketed kettle containing double-action agitators.

Line capacity runs up to 200 gal. of frappe per minute (4 lb. of stock per gal.).

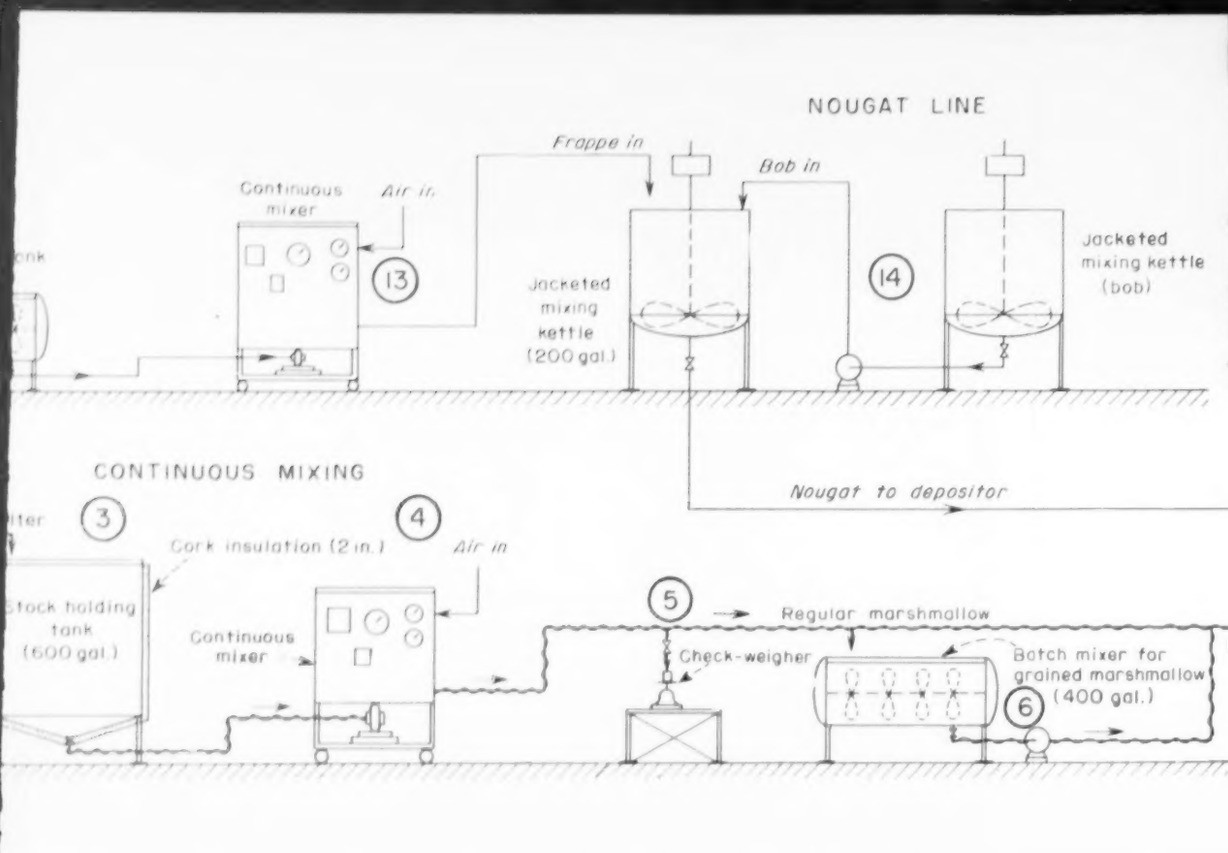
The bob is cooked in an adjacent kettle (14). It is a syrup containing sugar, honey, sorbitol, and water. When cooking end-point is reached (240-260F.), bob is pumped into the mixing kettle with the frappe, and is blended for about 5 min. with color, flavor, and fat.

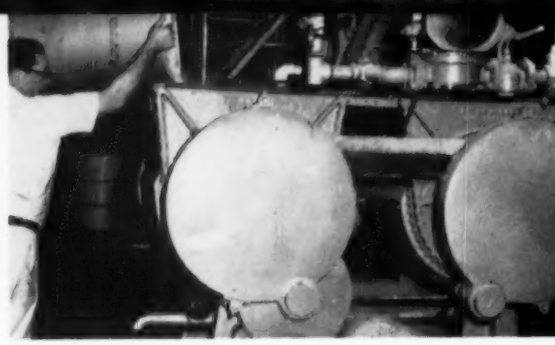
Completed nougat is then gravity-fed to the depositor, and is finally chocolate-coated.

FE gratefully acknowledges the help of Justin J. Alikonis, Research Director, Paul F. Beich Co., for details in this flowsheet—The Editors.



2 SPECIAL CHUTE-HOIST raises bags of sugar for dumping in marshmallow stock vat. Electric lift eliminates most of the hand labor.





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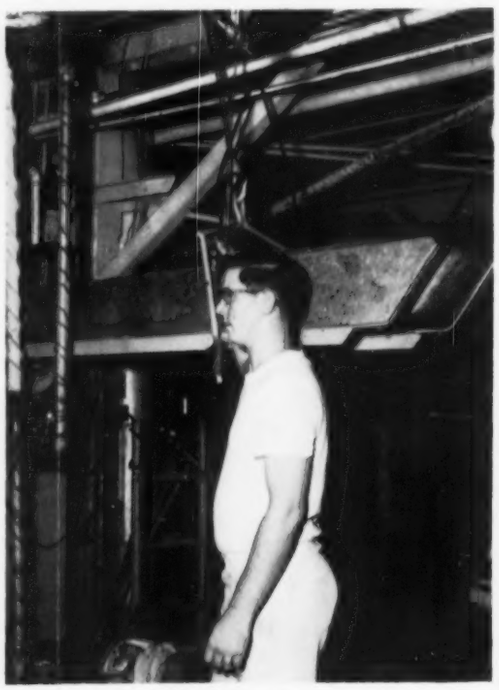

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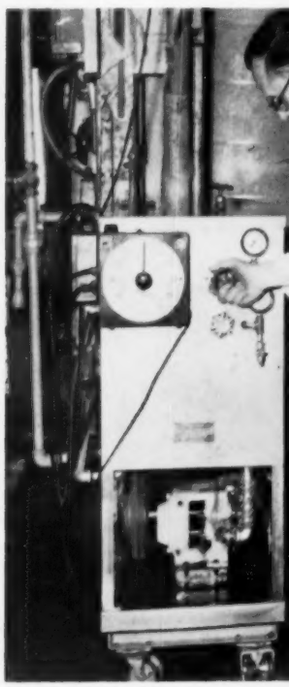
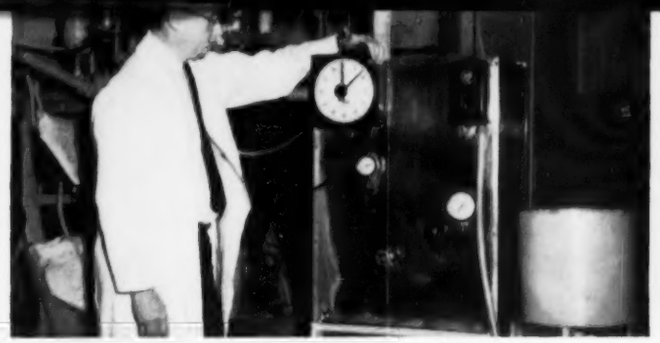
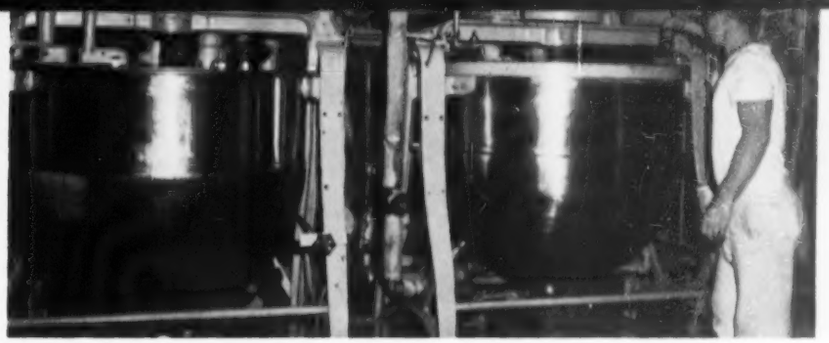


4 **MARSHMALLOW** is aerated It's done by spraying stock int against baffles to produce dispersio

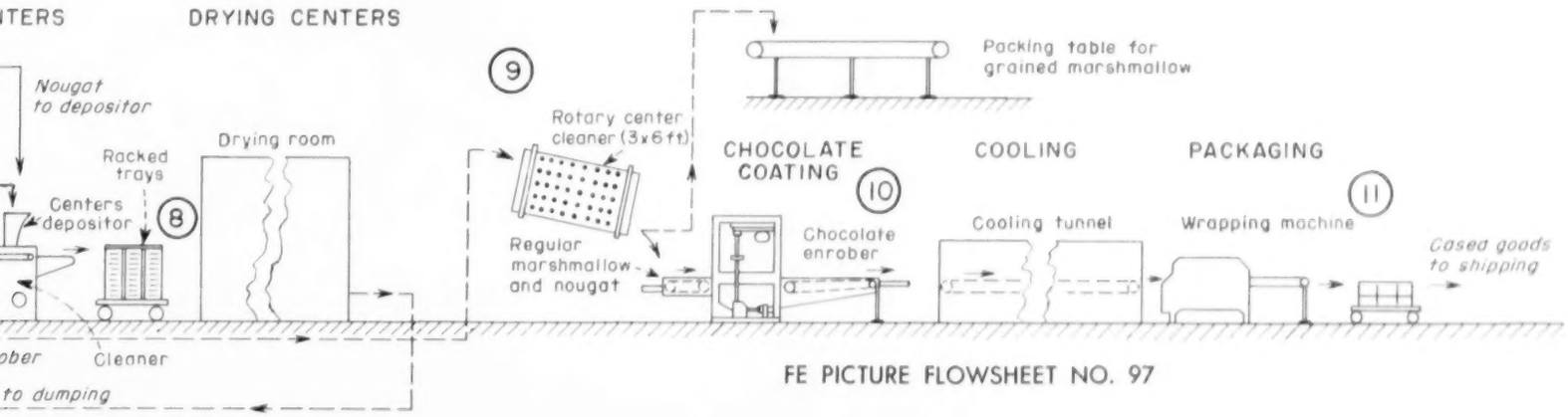
lly measured
ougat stock.



13 **CONTINUOUS MIXER** (like that used for marshmallow) whips stock into frappe. Automatic timer gages pump flow.



14 **NOUGAT BOB,** a syrup of sugar, honey, sorbitol, and water, is cooked in kettle (left), then pumped into mixing kettle (right) and blended with frappe.



FE PICTURE FLOWSHEET NO. 97

acrated in this portable mixer.
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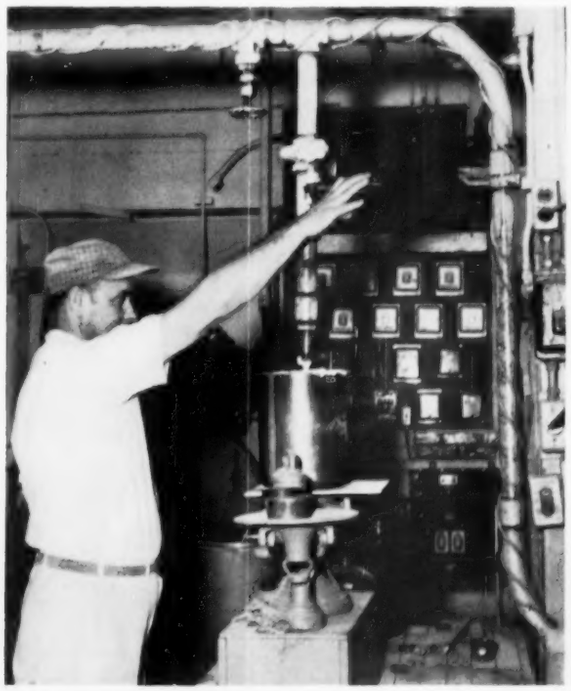
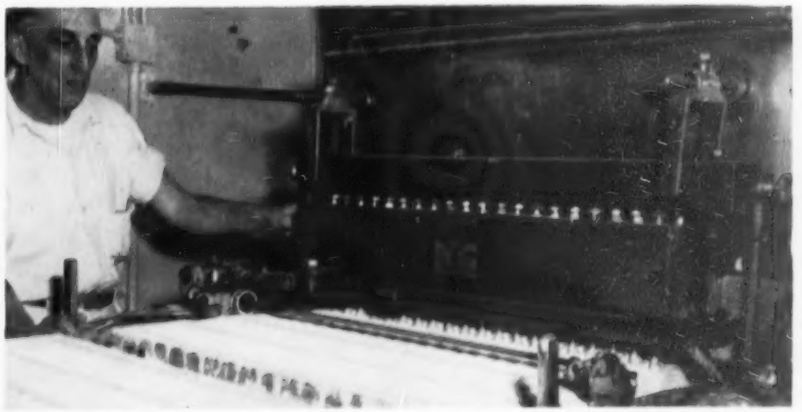
dispersion.

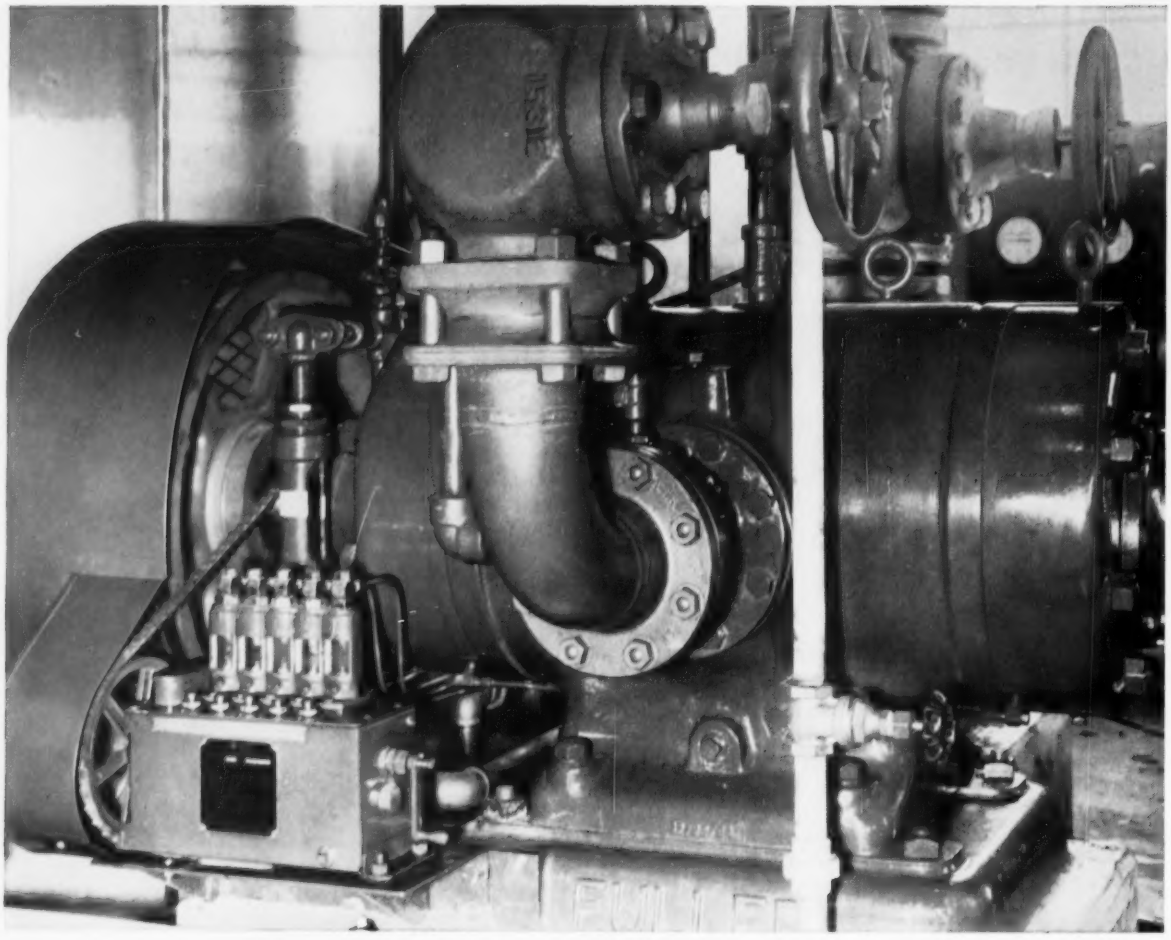


5 **QUALITY CONTROL** check point permits the product to be drawn off and gaged for specific gravity. Product specs are controlled by adjusting air pressure on continuous mixer.



7 **STARCH TRAYS,** containing mold impressions, pass under depositor and receive charge of regular or grained marshmallow. Finished goods are removed after curing.

9 **EXCESS STARCH** is removed from product in rotary screener (top). Clean marshmallows then chute to vibrator (foreground) that aligns them for trip over the bottomer.



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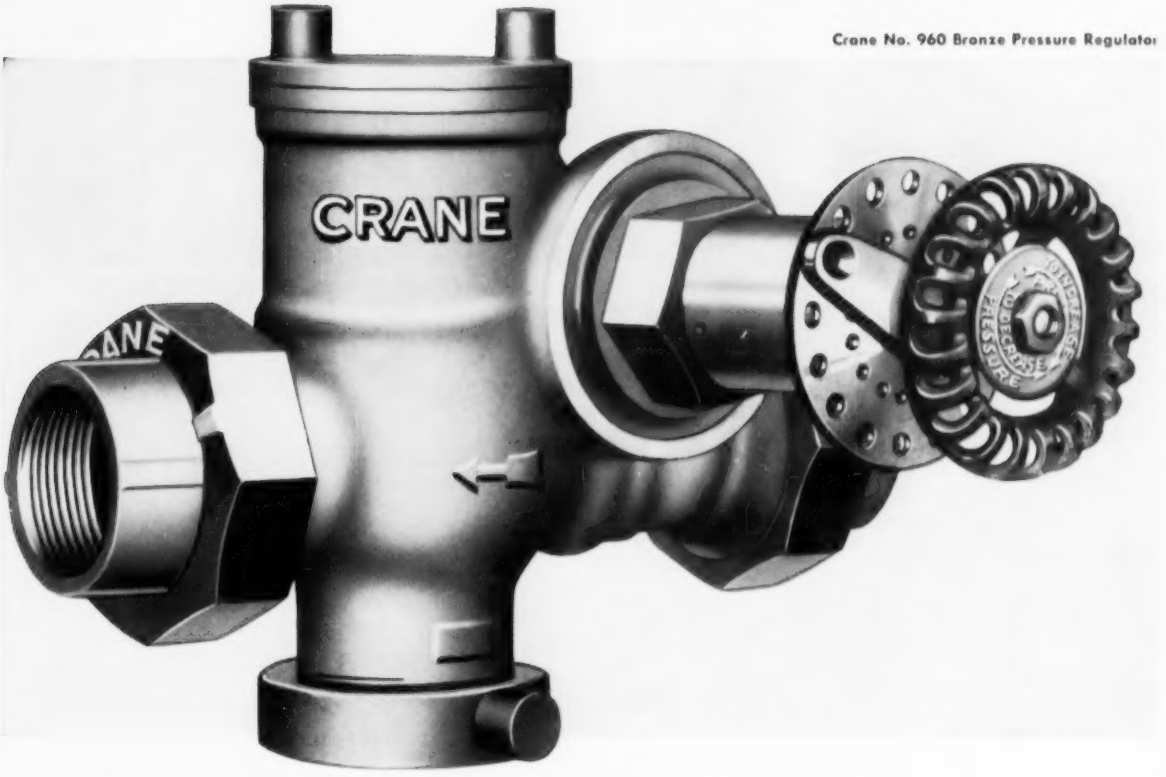

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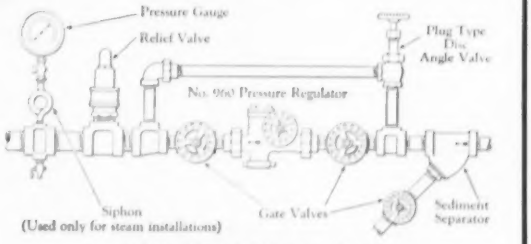

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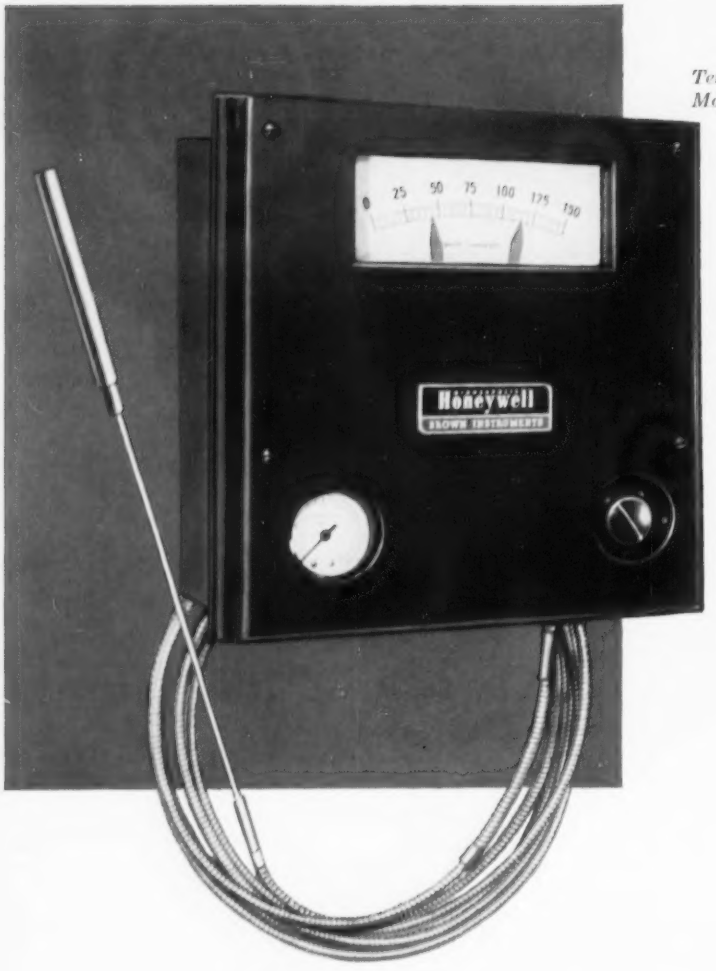

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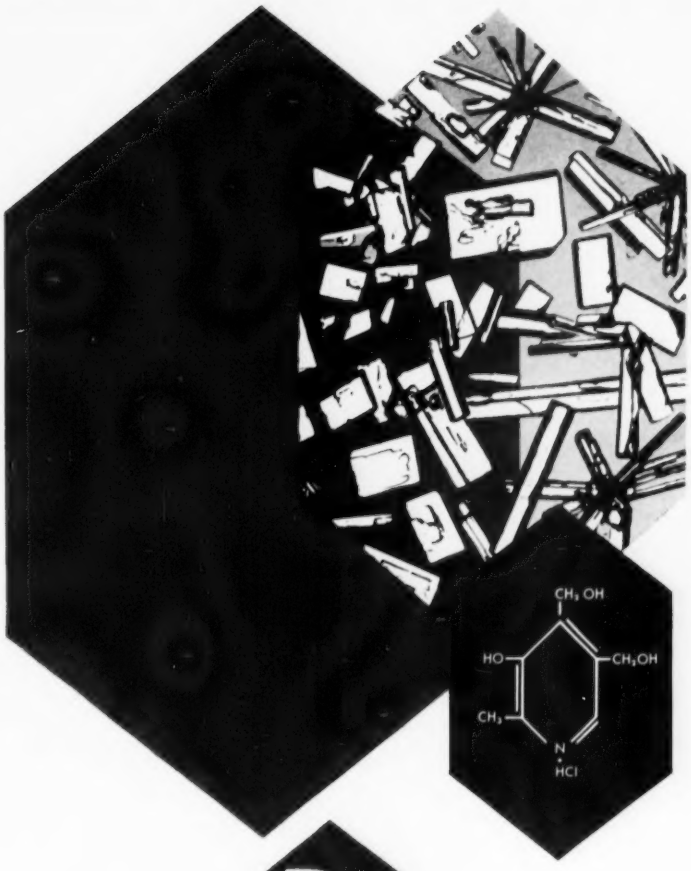

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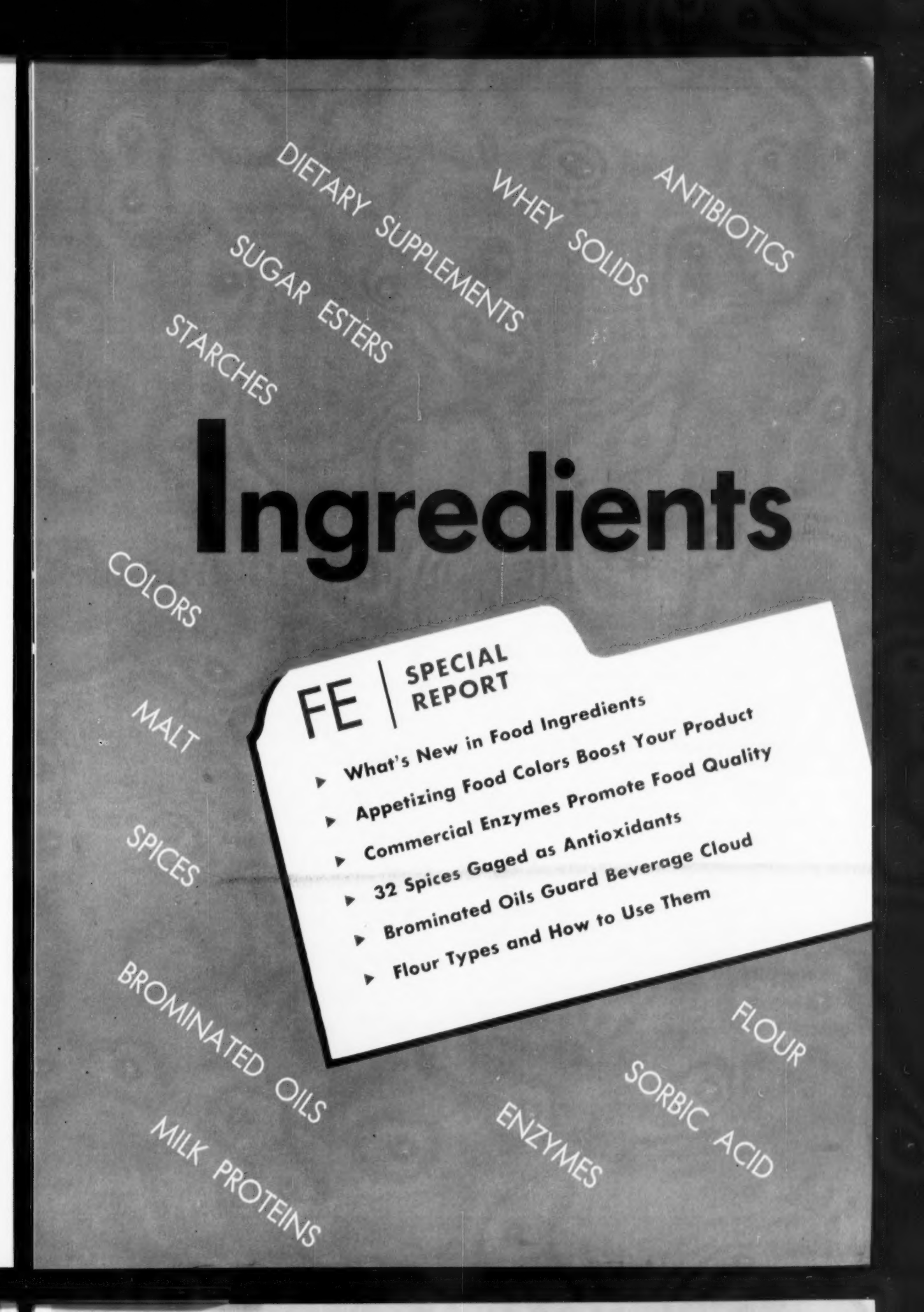
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SPICES
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FLOUR
SORBIC ACID
ENZYMES
MILK PROTEINS

The Key 'Whys' and 'Hows'

YOU—THE PROCESSOR—now have at your disposal a vast array of ingredients specially designed to boost consumer acceptance of your foods.

There are, for example, raw materials "tailored" to your particular needs, potent agents for extending product shelf-life, and dietary supplements that raise nutritional values.

Meanwhile, research is adapting new materials to food use and finding unique uses for existing products.

This Special Report accents latest developments, and it details current practice.

Food Colors Play Big Role

Product appearance is a quality factor assuming increasing importance. Here, your use of approved food colors plays a leading role in making your foods more attractive.

To standardize on just the right shade, you may be using the certified agents (coal-tar derivative) or the natural colors, such as annatto or turmeric. So for new ideas and techniques, specially note how these colors are used in baked goods, confections, beverages, fruits, dairy and meat products.

New Enzyme Applications

Enzymes are now being used to greater advantage in processing. And new applications promise still greater control of quality. They include—

A deoxygenation packet which, when placed in a hermetically sealed container, rapidly provides an oxygen-free atmosphere.

Reactivation of latent flavor precursors in heat-processed foods.

Cold-steriliaztion of milk (for cheese processing) with hydrogen peroxide—the enzyme catalase being used to remove residual peroxide.

What's New in Ingredients

Antibiotics, sugar esters, whey solids, malts, starches, milk proteins, dietary supplements —they promise higher-quality foods

LEONARD TRAUBERMAN
Assistant Editor, "Food Engineering"

TODAY'S TREND toward sharper control of food quality is dramatically underscored by the parade of new ingredients aimed at building extra values into food and guarding shelf-life.

Here is a rundown of latest developments:

Two antibiotics are now FDA-approved and commercially available for use in and on poultry (FE Jan. '56, p. 43 and FE Dec. '56, p. 53).

By delaying the onset of bacterial spoilage, these agents (chlortetracycline and oxytetracycline) are seen as effective supplements of conventional preservation methods. However, the refrigeration of treated birds is still essential.

With poultry, antibiotic treatment reportedly extends shelf-life from 7 to 14 days, or more. A tolerance of 7 ppm. has been established for agent residues, which are destroyed during normal cooking.

To date, use of these agents has been limited (by FDA) to poultry. But there is strong evidence, both from laboratory tests and practice outside the U. S., that antibiotics can also extend freshness of meats, fish, and vegetables. However, these applications must await further U. S. toxilogical studies.

Another antibiotic is of considerable interest to makers of processed cheese. This is nisin, which is produced by certain strains of the cheese starter *S. lactis* (FE Mar. '56, p. 90).

In small quantities it controls the gas-forming bacteria (Clostridia) that cause blowing, putrefaction, and liquefaction. Ultimately, its use is seen in canned and other processed foods.

Sucrose esters (also called sugar detergents) are prepared from readily available materials—sugar and fats or oils. Currently under test for FDA approval, they offer many food applications:

As *detergents:* Washing of produce and other items, also cleaning of process equipment, since residues are tasteless and non-corrosive.

As *wetting agents:* Speeding hydration and dispersion of dehydrates such as coffee, cocoa, milk, and eggs.

As *emulsifiers:* Improving flavor and/or consistency of shortening, salad oil, ice cream, peanut butter and other spreads, and cocoa butter in chocolate beverages.

As *anti-staling agents:* In baked goods.

As *anti-splattering additives:* In margarine.

These materials are produced as mono- or di-esters, thus one molecule of sucrose is combined with one or two fatty-acid methyl esters.

Whey solids are finding wide application as a nutritious food supplement that also improves flavor and texture of a variety of items. (FE June '56, p. 74).

As a result of special processing that converts lactose to the monohydrate, the modern product is a free-flowing powder, non-hygroscopic and readily water soluble. In addition, its protein is, for the most part, non-coagulated.

Here are its major uses—

Cheese foods and spreads: Imparts nutrients, desirable flavor, and spreadability.

Yeast-raised baked goods: Contributes to flavor, nutrition, and crumb structure.

Spotlighted in This Report

Brominated Oils Curb Separation In Beverages

Citrus-flavored beverages have special eye appeal when their flavoring oils are suspended as a stable cloud, which simulates the appearance of fruit juice. Moreover, presence of this cloud indicates that essential oils have been uniformly dispersed in the drink.

But since these oils are lighter than the finished beverage, special stabilizing techniques are required to prevent separation. Here, high-density brominated oils are widely used as weighting agents to raise specific gravity of flavoring oils to about that of the finished beverage, thus curbing separation.

Check the step-by-step formulation of stable flavor emulsions for applications in your field.

Spices Boost Food Stability

Spices have been used for centuries as food preservatives as well as flavoring agents. Their preserving effect is attributed to the antioxidants they contain, but until recently, little was known of their specific actions.

How they affect keeping quality of a variety of foods is detailed in this Special Report.

Flour Types, And Uses

As ingredients go, the flours used in production of baked goods and alimentary pastes are far from simple materials. Actually, there are a number of types derived from the different varieties of wheats.

Each of these has its own composition and characteristics that make it preferable for a particular product such as bread, cake, cookies, crackers, or macaroni products.

How unique flour is in its composition and functioning, and how its composition affects its usefulness for different products, are fully discussed.

Cookies and crackers: Enhances flavor, aids in developing color, and maintains proper dough viscosity.

Coatings and fillings: Boosts "dairy" flavor, improves bloom, and facilitates depositing.

Confections: Accentuates added flavors, inhibits "graining," and acts as a humectant.

Frozen desserts: Augments fruit flavors, improves body and texture, and cuts ingredient costs.

Whey solids are also of benefit in production of soups and comminuted meats.

Among latest developments is a sweet dairy whey specially processed before drying to permit controlled enzymatic hydrolysis of butter fat. Another innovation is a modified dried whey having high whipping properties.

Malt has long been used as a diastatic supplement in baking and brewing, yet research is just beginning to uncover its full potential.

Thus, preliminary results indicate its wider application as a nutritious food, also as a versatile flavoring and coloring agent. Furthermore, malt has been found to contain a potent preservative complex (not yet chemically identified) that points the way to greater control of oxidative rancidity.

Latest starches provide greater quality control and processing convenience.

Instant starch, produced by spray-drying of a cooked starch solution, offers faster thickening, inherent viscosity control, and greater stability. Applications include instant puddings, frozen desserts, dry food mixes, bakery toppings, and confections.

Specialty starches, too, are finding wider use. One product extends shelf-life of frozen soups, sauces, and gravies by providing low-temperature stability. Another, for use in processing of fruit-pie fillings, eliminates cooking and subsequent cooling.

New potato starches improve stability, taste, and appearance of many items. Chemically modified, these agents cut the time and temperature of cook required for proper viscosity.

Modified corn starches produce smooth, free-flowing cooked pastes that retain these properties on cooling and ageing. In addition, they improve gel clarity, increase water-holding ability, and achieve greater viscosity stability.

Milk proteins are a good source of well-balanced amino acids. They are soluble in water or milk, and compatible with many foods.

They have a bland flavor, are practically odorless, and are light-cream colored. Special grades that do not coagulate on heating are particularly suitable for use in baked products. Here, they offer three advantages:

1. Although not egg substitutes, they enhance the wetability of dried egg yolk to boost its baking properties. Thus, smaller amounts of yolk solids may be used in yeast- and chemically-leavened goods.
2. These agents expand on heating to improve specific volume of cakes.
3. They retard staling.

Meats provide another important use for milk proteins, which improve flavor and appearance of such items as meat loaves, bolognas, frankfurters, and liver products. As a meat ingredient, they—

1. Eliminate fat pockets.
2. Reduce smokehouse shrinkage.
3. Aid in retention of moisture and color.

Dietary supplements, other than vitamins, are widely used to boost the nutritional value of cereal products.

One such commercially available product is l-lysine, an essential amino acid that cannot be synthesized by the human body. It is a white crystalline powder (80 mesh) with 98% potency. And it is free of the d-isomer (which is not body-utilizable).

Another important supplement is gluten, which is derived from wheat flour. It is produced by washing most of the starch from the flour, and vacuum-drying the residue. A dry powder, it is easily mixed with other dry ingredients, imparting no odor or taste.

Applications include augmenting the protein content of baked goods, cereals, and macaroni products; fortifying special dietetic foods; and adjusting the protein-carbohydrate ratio of flour to any desired level.

THESE and many other food products owe their high degree of acceptance to use of attractive, yet harmless colors.

Appetizing Food Colors Boost Appeal of Your Products

They lend mouth-watering attractiveness to drab, colorless foods, minimize seasonal variations, accent elusive flavors, enhance appearance of products for special occasions

ARTHUR V. GEMMILL
Senior Associate Editor, "Food Engineering"

TO WIN MAXIMUM sales, your foods should be presented in their most appealing and attractive forms.

And here nothing contributes more than appetizing colors.

In some cases, such eye-catching hues are naturally present. But many foods normally appear drab and dull. They posed a problem. It was then found that these products could be made more attractive by addition of small amounts of harmless coloring substances.

Certain foods, too, vary in shade from one season to another. Here, edible colors now enable the processor to eliminate these variations, thus insuring uniformity of appearance at all times.

Still others have colors that do not correspond with those commonly associated with the particular flavor of the product. Or they have no color at all. In these instances, tasteful coloring lends mouth-watering appeal.

Choice of Approach

Two main types of materials—natural and certified FD&C colors—are presently available.

Until the middle of the last century, the food industry was dependent on materials derived from natural sources. But following Perkins' discovery of coal-tar dyes, we have had a wider range of colors of higher tinctural strength and greater brilliance. Also, by mixing two or more kinds you may obtain any blend.

At present, 16 different FD&C colors (see accompanying table) are approved for use in food products.

And in addition to the certified FD&C colors, there are the several natural products used to color foods, as indicated in our tabulation.

One of the most important of the latter is annatto, which is derived from the pulp surrounding the seeds of a small Brazilian tree, Bixa Orellana. It is used for coloring butter, cheese, ice cream, margarine, shortening, bakery products, and edible oils.

Other vegetable colors include:

1. Natural carotene and carrot oil, extracted from carrots and alfalfa.
2. Caramel, or burnt sugar.
3. Alkanet, a red dye prepared from alkannin, an amorphous powder made from the roots of the Alkanna plant.
4. Saffron, the orange colored dried stigmas of Crocus *sativus*.
5. Edible carbon black.

An additional product that is assuming considerable importance as a color for margarine and shortening is β-carotene, prepared by chemical means. As with natural carotene and carrot oil, this product plays a dual role—fortifying with vitamin A as well as imparting the desired yellow color. Other uses are seen for this product in butter, cheese, baked goods, and edible oils.

Since colors are widely used in all branches of our industry, let us have a look at their specific employment in some representative fields:

Baking and Cereal Products

Importance of color in baked products is evidenced by the scoring system commonly used for white pan bread. This allows 8 points for crust color, and 10 for that of the crumb, compared with 25 for flavor out of the total 100 points.

Much of this color is contributed by the ingredients, or produced by the browning reaction that occurs during processing.

But in many other products, colors are added to serve such purposes as: (1) Increasing their attractiveness, and (2) accentuating characteristic properties.

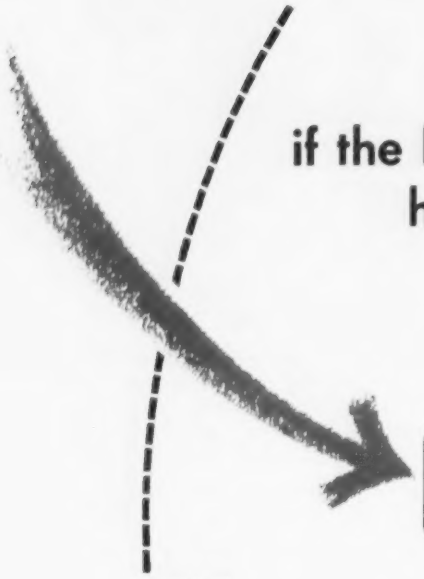
Their use in icings for decorative purposes is an example of the first named. And in breakfast cereals containing various fruit flavors, colors that simulate the hues of the rainbow are added to accent these flavors.

The organized baking field is opposed to use of color as a means of masking inferior products. However, bakers are convinced that products containing liberal quantities of certain ingredients are more acceptable

COLORS Find Uses In a Wide Range of Food Products

COLORS FD&C	Candies	Cakes	Sweet Rolls	Cookies	Icings	Cake Mixes	Ice Cream	Sherbets	Butter	Cheeses	Cereals	Soft Drinks	Sausage Casings	Oranges	Imitation Mint Jelly	Instant Desserts	Maraschino Cherries	Margarine	Shortenings	Meat Stamping	Beverage Powders
Red No. 1	●	—	—	●	●	●	●	●	—	—	●	●	—	—	—	●	●	—	—	—	●
No. 2	●	●	●	●	●	●	●	●	—	●	●	●	●	—	—	●	—	—	—	—	●
No. 3	●	—	—	—	●	—	—	—	—	—	—	—	—	—	—	—	●	—	—	—	—
No. 4	●	—	—	●	●	●	●	●	—	—	●	●	●	—	—	●	●	—	—	—	●
No. 32*	—	—	—	—	—	—	—	—	—	—	—	—	—	●	—	—	—	—	—	—	—
Yellow No. 1	●	—	—	—	—	—	—	—	—	—	—	—	●	—	—	—	—	—	—	—	—
No. 2	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. 3	●	—	—	—	—	●	—	—	●	●	—	—	—	—	—	—	—	●	●	—	—
No. 4	●	—	—	—	—	●	—	—	●	●	—	—	—	—	—	—	—	●	●	—	—
No. 5	●	●	●	●	●	●	●	●	—	●	●	●	●	—	●	●	—	—	—	—	●
No. 6	●	●	●	●	●	●	●	●	—	●	●	●	●	—	—	●	—	—	—	—	●
Green No. 1	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. 2	●	—	—	—	—	—	—	—	—	—	—	●	—	—	—	—	—	—	—	—	—
No. 3	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	●	—	—	—	—	—
Blue No. 1	●	●	—	●	●	●	●	●	—	—	●	●	—	—	●	●	—	—	—	—	●
No. 2	●	●	—	—	—	—	—	—	—	—	—	—	—	—	—	●	—	—	—	—	—
Violet No. 1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	●	—
Natural Colors																					
Carotene	—	—	—	—	—	—	●	—	●	●	—	—	—	—	—	—	—	—	●	—	—
Burnt Sugar	●	●	—	—	●	●	●	—	—	—	—	●	—	—	—	—	—	—	—	—	—
Annatto	●	●	●	●	—	●	●	—	●	●	—	—	—	—	—	—	—	●	●	—	—
β. Carotene	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	●	●	—	—
Saffron	—	—	—	—	—	—	—	—	●	—	—	—	—	—	—	—	—	—	—	—	—
Alkanet	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Carbon Black	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

*FD&C Oranges Nos. 1 and 2, and Red No. 32 were decertified on Nov. 16, 1956. The latter, however, was reclassified as External D&C Red No. 14, and is specifically permitted for coloring oranges until Mar. 1, 1959.



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FDA Questions Yellows

Proceedings launched Jan. 24 by FDA could result in banning four widely used colors—FD&C Yellows Nos. 1, 2, 3, and 4.

This would strike dairy products manufacturers who use some of these in butter, cheese, and ice cream, and makers of margarine.

Previously (Nov. '55) FD&C Oranges Nos. 1 and 2, and Red No. 32 were decertified. Specifically affected were citrus packers who relied on Red No. 32 to give oranges their "natural" color.

However, a dispensation came their way: They got the nod—temporary authorization—for using Ext. D&C Red No. 14 (reclassified Red No. 32) until Mar. 1, 1959 (see also table on p. 117).

when the color of these ingredients are accentuated.

In the manufacture of butter bread, for example, neither the color nor flavor of the butter can be easily detected by the uninitiated. For this reason, bakers may add yellow color to yield a product that is easily distinguishable from ordinary white bread.

And in production of rye or whole wheat breads, bakers frequently use caramel color to accentuate the color of the whole-grain flours.

In production of sweet rolls it is customary to include whole eggs. But due to the different-type mixing equipment employed in a bakery, the commercial product seems to be paler in color than sweet yeast-raised products made in the home. For this reason, bakers frequently add yellow color in production of sweet rolls and coffee cakes.

Many Used In Confections

In the manufacture of candy, many ingredients impart the desired color to the finished product. Among these are molasses, brown sugar, caramelized milk, cocoa, and chocolate.

But when certain fruit juices, and other products, are used to give a natural flavor, the colors they impart are usually insufficient to provide the desired degree of acceptance. Here, artificial colors are added to strengthen the natural ones.

Small quantities of the vegetable colors alkanet and annatto are sometimes used in candy coatings. And caramel color finds use in candy processing. A further example of vegetable coloring is use of edible carbon black in making licorice.

For many types of candies, certified food colors are the most satisfactory, since any desired shade can be prepared by combining two or more of the primary ones.

How this coloring is used depends on the individual manufacturer, particularly on his recognition of the importance of color in consumer appeal. The normal rule of thumb is to make the product look "natural." But this is not always the case.

Lemon drops are supposed to be yellow by association, but most candies may be colored purely to attract rather than to call on past recollection of the product in its natural state.

The red on peppermint stick, for instance, is not indicative of peppermint, for the finished candy is pure white, and the color of natural mint is green. However, red and white have been associated with peppermint candies for so many years that we now think of them in terms of these colors.

One of the requisites of high quality candy is color that is usually kept warm, soft, and inviting. Exceptions, of course, are the products for special days. For Hallowe'en, orange and volcano black come into prominence. Christmas automatically brings red and white candy to mind. Green candies are next in importance at this time, and multi-colored candies find various uses.

Marzipans are another example of highly colored candies for special occasions. These may be made to resemble foods—such as eggs on toast, vegetables, fruits, and the like. The pieces are usually hand colored to simulate the natural products.

Aside from color selection, the candy maker has other problems in connection with their uses. While fading is not very common, it does exist. Over-coloring is another problem. Bright, attractive shades never result from loading a product with certified color. If the product is too light in shade with a normal amount of one color, it is better to try a darker one rather than to use too much of the light shade.

Processing techniques, used in securing various colors and incorporating them in confections, involve the chemistry of food manipulations under innumerable conditions.

Among these are changes over a wide range of temperatures, crystalline structure, texture, and liquidity of varied solutions of many products, such as sweeteners, dairy products, nuts and fruits, fats, oils, and flavors.

Dairy Products, Also

Color of dairy products has great significance for both the processor and the consumer. To the latter, the yellow color of milk or cream implies quality or richness. To the technical man this color is a measure of beta-carotene, and perhaps vitamin A.

About 90% of the yellow color in milk fat is due to beta-carotene. This yellow color is seen most distinctly when the fat is churned into butter.

But cream, butter, and cheese may show a wide seasonal variation in color, unless is it standardized. For this purpose, annatto has long been used. However, yellow color can be imparted to butter by addition of Yellow AB (FD&C Yellow No. 3), or Yellow OB (No. 4), or blends of them.

Color has special significance in the cheese field, too. The particular shade of blue or green helps to distinguish Roquefort from Stilton, Gorgonzola, and American Blue Cheese. Saffron is used to impart a yellow color to Bernarde, Caciotta, and soft box cheese. Edam, baby Gouda, Chantelle, Patagras, and Asiago are often coated with red wax, while Runesten is wrapped in red transparent film.

Powdered clover leaves, used in making Sapsago cheese, impart a characteristic greenish color. Surfaces of Gloucester and Bagozzo cheeses (and sometimes Edam) are colored with red dye. Gray cheese gets its color from a gray mold used in making it. Annatto is used to color Livarot and Muenster. Provolone and Manteca are sometimes smoked. Parmesan may be coated with a mixture of burnt umber, lampblack, and dextrin dispersed in wine or grapeseed oil. And in this country, a coating of black paraffin is sometimes used to identify aged cheddar.

Attractiveness of ice cream is increased by use of colored fruits and flavors. An example is the well-known Neapolitan brick, in which the flavors, vanilla, strawberry, and chocolate are layered in white, pink, and

brown to accent that particular assortment of flavors.

The natural flavoring material used in mint ice cream would leave the product white. But green color is added because we expect mint ice cream to be green. Orange sherbet needs more color than the natural orange juice imparts to it.

Meat Products

When prepared, in Federally inspected plants, for interstate commerce, meat products may only use color under conditions prescribed by regulations of the Meat Inspection Branch of USDA. Actually, such employment of color in this country is limited almost entirely to sausage products.

Among those approved are the natural materials, alkanet, annatto, carotene, cochineal, chlorophyll, saffron, and turmeric, and the certified coal-tar dyes.

These colors, or mixtures of them, may be applied to animal and artificial casings enclosing sausage products, provided there is no penetration of the color into the product. When there is evidence of color on the casing, or on the surface of the sausage product if the casing is removed, the label must contain the statement "artificially colored."

Principal coal-tar colors used in meats are: Red Nos. 1, 2, and 5, and yellow No. 5. Violet No. 1 is employed in stamping inks. The natural product annatto is used to some extent for coloring braunschweiger.

In Federally inspected plants, coloring of sausage products is done by dipping momentarily in the color solution, cooking the sausage in it, or spraying the filled casings.

In applying color by these techniques, a number of factors must be carefully considered. Among them are solubility of the dye at different temperatures; reactivity with solvents, container materials, and the product; and uniformity of coloring strength.

Also extremely important is composition of the meat mass as it influences final color. For example, under identical conditions, the all-pork and all-veal products will color differently from all-beef products.

When sausage is cooked in a color solution, there is a Meat Inspection Bureau limit of 1 oz. of color per 500 gal. of water, but slightly less than this concentration is generally used. The bath temperature is held constant somewhere in the 150-190F. range, and the product is cooked to an internal temperature of 148F.

When color is imparted by dipping, the smoked, cooked product is repeatedly dipped in a bath (24-40 oz. of color per 500 gal. water) at about 160F., until desired color is obtained. In spraying or showering, a solution of 2-4 oz. of color per 500-gal. is used, being jetted over the smoked and cooked sausage for 10-15 min. at about 160F.

Regardless of the method, the sausage should be rinsed in cold water, immediately after coloring, to remove adhering dye, prevent spotting or streaking, and decrease likelihood of penetration into the meat mass.

With Red No. 1, concentration, as well as time and temperature of application, affect final color intensity. With Reds No. 2 and 4, Yellow No. 5, and Blue No. 2, the above factors have no influence above a limiting final color concentration.

Several packers of lard are now coloring this shortening with annatto. It gives the product a golden color and enhances appearance of foods made with it.

Some Fruits Are Colored

Only two fruits are colored extensively in this country —cherries and oranges. Maraschino cherries are characterized by their bright red color, which is produced by cooking the previously bleached and blanched fruit in a light sugar syrup containing certified color (FD&C Red Nos. 1, 3, and 4).

In many citrus producing areas, soil and climatic conditions are such that formation of chlorophyll continues in the fruit as well as in the foliage.

This is particularly true of Florida oranges, which may contain the desired solids-to-acid ratio even though their peel is quite green. This condition led to development (by USDA) of the ethylene gas method for bleaching of chlorophyll.

This treatment has produced a satisfactory degree of coloration in some areas. However, it has not worked well for the greater part of the Florida, Texas, and Louisiana crop. For this reason, dyeing was adopted.

In the color-added process, oranges are passed through a flood of emulsified color at temperatures between 112 and 124F. Duration of exposure varies from 1 to 4 min. Uptake of color is limited to the outer layers of the peel, in which the dye attains a concentration of approximately 20 ppm. Following this treatment, the fruit is rinsed, dried, and given a protective coating of wax.

The Florida Citrus Code requires that color-added oranges meet higher standards of maturity than fruit not colored.

When this treatment of oranges began in 1934, colors such as annatto and yellows AB and OB were employed. These did not prove entirely satisfactory and so were replaced in 1935 by FD&C Orange No. 2. During the 1938-39 season, FD&C Red No. 32 came into use, and almost completely displaced all other colors. When it was decertified in 1955, its use (under the name Ext. D&C Red No. 14) was authorized specifically for coloring oranges until Mar. 1, 1959.

Percentage of total Florida orange crop that is colored varies from season to season. However, it is estimated to range from 60 to 75%.

Soft Drinks

As in the confectionery field, colors greatly increase the acceptance of soft drinks.

Some of the true fruit flavored drinks, such as raspberry, cherry, and strawberry, frequently obtain their colors from the fruit that provides the flavor.

But most of the other flavors contain either vegetable or certified colors. Among the former, caramel plays an important role. It is added to cola, cream soda, ginger ale, root beer, sarsaparilla, cocoa-cream, and celery.

FD&C certified colors are used in fruit flavored beverages, such as orange, lemon (cloudy), lemon & lime, grape, and pineapple. Another large use of FD&C colors is in production of low calorie beverages. For this product, many bottlers use nothing but FD&C colors.

Acknowledgment: Material presented here on baking, cereals, confections, dairy, meat, and citrus products is based on information from papers delivered at the session on Application of Colorants to Foods, The Perkin Centennial, Sept. 12, 1956, New York City.

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Handy Check-Table Shows Products Improved, Agents Employed

	Carbohydrases				Proteases				Glucose Oxidase		Catalase		Pectinases	Cellulase (Hemicellulase)	Flavor Enzymes
	Fungal	Bacterial	Animal	Plant	Fungal	Bacterial	Animal	Plant	Fungal	Fungal	Bacterial	Animal	Fungal	Fungal	Plant
Baked Goods	✓			✓	✓			✓							
Beer	✓	✓		✓	✓	✓	✓	✓	✓	✓					
Carbonated Beverages									✓	✓					
Cereals	✓	✓		✓	✓										
Chocolate — Cocoa	✓	✓				✓							✓		
Coffee													✓	✓	
Confectionery	✓	✓		✓											
Milk									✓	✓	✓	✓			
Cheese			✓	✓					✓	✓	✓	✓			
Eggs									✓	✓					
Feeds — Animal					✓	✓	✓	✓							
Flavors	✓								✓	✓			✓		
Fruit Juices	✓								✓	✓			✓		
Meat — Fish					✓	✓	✓	✓							
Protein Hydrolysates					✓	✓	✓	✓							
Syrups	✓	✓	✓	✓					✓						
Vegetables	✓	✓													✓
Wine													✓		

COMMERCIAL ENZYMES—

Potent Catalyzers That Promote Quality

Today, there's hardly a food product that can't be improved by these do-it-better agents. Here's how they act, where they're used, and a look at the future

L. A. UNDERKOFLER and W. J. FERRACONE

Director of Research and Director of Sales, Takamine Laboratory, Clifton, N. J.

PRODIGIOUS WORKERS, enzymes have now been harnessed to perform many intricate and desirable tasks, virtually in every branch of food processing.

For the baker, brewer, and confectioner, they liquefy and saccharify starches, convert sugars, and modify proteins.

In fruit-juice and wine processing, they boost press yields, improve juice clarity, also speed filtration.

And by de-sugaring eggs, they curb deterioration of color and flavor in the dried product.

These are but a few of the jobs that enzymes are doing in the food industry. We will describe the major ones, point out some of the lesser known uses, and explore several proposed applications. But first, a look at the pertinent properties of enzymes:

These agents are proteinaceous biocatalysts elaborated by living cells to bring about specific biochemical reactions required for cell metabolism.

For industrial use[1], enzymes offer these five significant advantages:

1. **They are non-toxic and of natural origin,**
2. **Highly specific in their actions,**
3. **Work best at mild temperature and near-neutral pH,**
4. **Act rapidly at relatively low concentrations, and are**
5. **Readily inactivated when reaction is complete.**

All living tissues (animal, plant, and microbial) are potential sources of industrial enzymes. Today, they are extracted (most commonly) from microorganisms, seeds, plant sap or latex, and glandular tissues.

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are seldom separated. For example, a commercial or bacterial amylase may also contain varying unknown amounts of other agents, such as carbohydrases and proteases. However, for most amylase applications, presence of other enzymes is not a disadvantage, and sometimes it may even be useful.

In its processing, the enzyme extract is clarified (by centrifuging or filtering), then may be concentrated under vacuum. Following precipitation, the product is vacuum-dried.

Such a powder occasionally is sold (undiluted) on a potency basis. More often, though, commercial enzymes are diluted to a standard potency, suitable diluents being salt, sugar, wheat flour, or diatomaceous earth, depending upon compatibility with the enzyme and its use. Most of these preparations are stable in dry form, but many require stabilizers and activators for best performance.

As shown in our use table, most enzymes currently employed in food processing are in the general class of hydrolases, agents that catalyze hydrolysis of more or less complex organic compounds. Subclasses of particular importance in this group are carbohydrases, pectinases, and proteases.

In addition to these hydrolyzing agents, two enzymes of oxidation (glucose oxidase and catalase) are finding extensive use.

CARBOHYDRASES

Starch conversion is a prime application for the carbohydrases, which hydrolyze polysaccharides or oligosaccharides. Greatest commercial use has been for the amylases, which act on starch, although several other carbohydrases also have industrial importance.

Here in greatly oversimplified form, are the types of reactions[2, 3, 4, 5] catalyzed by the amylases:

$$\text{Starch} \xrightarrow[\text{liquefying amylase}]{\alpha\text{-amylase}} \text{Dextrins} + \text{Maltose}$$

$$\text{Starch} \xrightarrow[\text{saccharifying amylase}]{\beta\text{-amylase}} \text{Maltose} + \text{Limit Dextrins}$$

$$\text{Dextrins} \xrightarrow{\text{dextrinase}} \text{Maltose}$$

$$\text{Starch or Dextrins} \xrightarrow{\text{amyloglucosidase}} \text{Glucose}$$

Where gelation or "setting up" of starch is a problem, or starch is to be saccharified, amylases of fungal, bacterial, or plant (malt) origin are required. And a variety of products with "tailored" properties are available.

Occasionally a mixture of enzymes, from different sources or special strains of molds or bacteria, is needed. Special amylase types may be relatively high or low saccharifying, high or low liquefying, and relatively heat stable or labile.

In fact, there are now available a range of products suitable for any degree or kind of starch conversion.

Baking provides a major use for amylases, whose function has long been a subject of considerable study.[6, 7, 8, 9]

It is common practice to fortify flour with malted cereals to boost its amylase content. The baker then adds other diastatic supplements, usually of fungal origin. Action of α-amylase is to up sugar production through greater starch conversion, which in turn increases gas formation and improves crust color.

Softening action of enzyme supplements on bread doughs is more a matter of protease action. But α-amylase does have some softening effect, which is limited by the amount of susceptible (damaged) starch granules present. As starch is gelatinized during baking, excess cereal α-amylase may impart a sticky, gummy crumb, although loaf volume is still good.

Low inactivation temperature of fungal α-amylase (about 70C.) permits the baker to use much higher levels of this enzyme than of cereal or malt amylase without causing excessive dextrinization of starch during baking. On the other hand, the higher inactivation temperature of bacterial amylases (80-90C.) requires that they be used only at very low levels of activity.[8]

Use of bacterial amylase is not permitted by Federal

3 New Applications That Show Big Promise

Recent strides in research indicate that we may soon see a blossoming of commercial microbial-enzyme applications—in contrast to the long years of sparse developments.

In particular, two advances appear to be of tremendous import:

The deoxygenation packet, recently patented,* represents a truly unique use. Involved here is packaging of the glucose oxidase-catalase enzyme system, along with appropriate buffers and glucose, in an air-permeable, water-impermeable film, such as polyethylene.

When placed in a hermetically sealed container, this packet's reactants rapidly take up oxygen in the container, leaving an oxygen-free atmosphere.

This application has been under investigation at the QM Food & Container Institute, Chicago, which reports special effectiveness in dried and dehydrated products containing fats and other oxygen-sensitive constituents.

Accordingly, such packets are seen offering a practical solution to the problem of packaging "troublesome" food items—especially those in which fat rancidity cuts shelf-life. These may be named dried whole milk, seafoods, cereal products, coffee, cocoa, also dehydrated potatoes, meats, and eggs.

Food flavors. Another revelation promising widespread application centers on the reactivating of latent flavor precursors.**

This use is based on the theory that flavors are produced by action of enzymes on chemical compounds or flavor precursors, which are in turn formed from their own precursors.

Briefly, heat processing tends to destroy a food's natural enzymes—with volatile flavors lost, as well. However, careful control of heat treatment will allow flavor precursors to survive. And an addition of enzyme would restore proper flavor.

These specific enzymes are obtained from the fresh material or a related source. Currently, extraction of them is by conventional means. But it's believed they eventually will be produced by microorganisms at low cost.

Full importance of this development is presently difficult to evaluate. However, there is the enticing possibility that this technique may solve many complicated food problems and unveil numerous secrets in flavor chemistry.

Cold-sterilization of milk for cheese processing, now under consideration, would provide a specific use for the enzyme catalase.

Here, hydrogen peroxide would be added to milk to sterilize it, and catalase would be used to remove residual hydrogen peroxide to permit proper growth of starter cultures.—*The Authors.*

* Scott, D., *Deoxygenating Process and Product.* U.S. Pat. 2,758,932. Aug. 14, 1956.

** Hewitt, E. J., Mackay, D. A. M., Konigsbacher, K. and Hasselstrom, T.: "The Role of Enzymes in Food Flavors." *Food Technol.*, 10, 487-89, 1956.

Standards of Identity for bread, whereas addition of fungal amylase derived from *Aspergillus oryze* is allowed.

These differences during baking, in behavior of fungal, cereal, and bacterial amylases point up the advantage of having a choice of enzymes for specific functions. It has been suggested[10, 15] that fungal amylase supplements be added to flour at the mill, but present Federal Standards permit such addition only by the baker.

Brewing is another important application for amylases. Not only does the malt employed contribute to flavor, but the amylase present usually is sufficient to saccharify much of the additional starch introduced as adjuncts of rice or corn grits.

In the first steps of mashing, adjuncts must be cooked to gelatinize the starch. Here, amylase liquefies the starch to produce a free-flowing slurry. Conventionally, malt is used in this step, but sometimes this may entail disadvantages of cost and possible undesirable flavor when malt husks are boiled in the mash.

Therefore, heat-stable bacterial enzymes have found favor as a source of liquefying enzyme for initial gelatinizing and cooking. Fungal amylases may be employed later, along with malt during the saccharifying operation, to supplement low-diastatic malt.

Syrup production by conversion of partially acid-hydrolyzed starch is controlled by selective action of amylases.

In acid hydrolysis, proportions of dextrose, maltose, higher oligosaccharides, and dextrins are always the same for a hydrolysis product of any given dextrose equivalent. Amylases produce a patterned or conditioned hydrolysis because they have a specificity for certain linkages. Hence, malt-amylase-converted syrup has a strikingly different composition from that of acid-converted syrup.

Further, control of syrup composition is provided by proper use of fungal amylases. By employing malt and fungal amylases to provide β-amylase, α-amylase, and amyloglucosidase, or maltase, singly or in combination, it is possible to obtain an almost unlimited variety of hydrolyzed starch products, and therefore, syrups with any desired properties.[12, 18]

Three such products have been produced commercially. One is converted to about 63 D.E. (dextrose equivalent). It has high sweetening power and no tendency to crystallize. Another, at about 55 D.E., has moderate sweetness and high fermentability. The third (over 90 D.E.), with sweetness almost equal to pure dextrose, is palatable without further purification and crystallizes to a solid mass.

Crystalline dextrose is also obtainable from such high enzyme-converted starch, and probably is manufactured more economically than dextrose from the acid-hydrolysis process.

Further applications of amylases are found in processing of:

Cereal products, where bacterial, cereal, or fungal amylases are employed in preparation of food dextrin and sugar mixtures, also in processing of cereals for dry breakfast foods (before flaking and granulating).

Chocolate syrups and licorice, which are kept free-flowing through the starch-liquefying action of amylases.

Scrap candy of high starch content, where amylases are required to permit efficient recovery of sugars.

Certain fruit extracts and juices, where amylases remove starch.

Clear starch-free pectin, which requires use of a fungal preparation that is free of pectinase enzyme.

Vegetable purees, where amylases modify the starch. Also in treating vegetables such as peas, for canning[14].

Of considerable commercial importance, too, are the disaccharide-splitting carbohydrases, which catalyze the following reactions:

$$\text{Maltose} \xrightarrow{\text{maltase}} \text{Glucose} + \text{Glucose}$$

$$\text{Sucrose} \xrightarrow{\text{invertase}} \text{Glucose} + \text{Fructose}$$

$$\text{Lactose} \xrightarrow{\text{lactase}} \text{Glucose} + \text{Galactose}$$

$$\text{Raffinose} \xrightarrow{\text{yeast invertase}} \underset{\text{(Fructose+Glucose+Galactose)}}{\text{Fructose} + \text{Melibiose}} \quad \underset{\text{(Glucose+Galactose)}}{}$$

$$\text{Raffinose} \xrightarrow{\text{fungal invertase}} \text{No Reaction (Glucose not terminal)}$$

These enzymes may be obtained from fungal or bacterial sources, but the major commercial sources of invertase and lactase are yeasts. To be noted is the specificity of yeast invertase (which attacks fructose end of molecule), as compared to fungal invertase (which attacks glucose end of modecule and has no effect on raffinose, in which glucose is not terminal).

Invertase[16, 18] is used in manufacture of artificial honey, and of invert sugar, which is more soluble than sucrose. This increased solubility is important in processing of liqueurs, ice creams, and confectioneries where crystallization of sugar must be avoided.

Invertase also is used in centers of chocolate-coated, soft-cream candies. Molding and coating are carried out while the centers are firm, the enzyme action later producing a smooth, stable cream.

In ice-cream production, use of lactase[17] has been suggested to prevent lactose crystallization, which results in a "grainy" or "sandy" product.

PECTINASES

Fruit and wine processing make most extensive use of the pectolytic enzymes.[18, 19]

Two such agents are pectinesterase, which hydrolyzes methyl groups of the soluble pectin molecule, and polygalacturonase, which hydrolyzes polygalacturonate chains to monogalacturonic acid. Here are the reactions:

$$\text{pectin} \xrightarrow{\text{pectinesterase}} \text{methanol} + \text{polygalacturonic acid}$$

$$\text{polygalacturonic acid} \xrightarrow{\text{polygalacturonase}} \text{monogalacturonic acid}$$

Most commercial pectolytic preparations are mixtures of pectinesterase, polygalacturonase, and other enzymes. Presence of other agents has been demonstrated in experiments with Concord grape juice. Here, viscosity reduction was still obtained when both the polygalacturonase and pectinesterase had been heat-inactivated. Action of these other enzymes often is supplementary on pectin.

Pectins generally are colloidal in nature, thus they make solutions viscous and hold other materials in suspension. Pectinesterase, by removing methyl groups from the pectin molecule, exposes the highly reactive carboxyl groups. In the presence of multivalent cations such as calcium, insoluble salts will be formed, and these can be removed.

Polygalacturonase, by degrading the macromolecular pectin, will destroy the protective colloidal nature of

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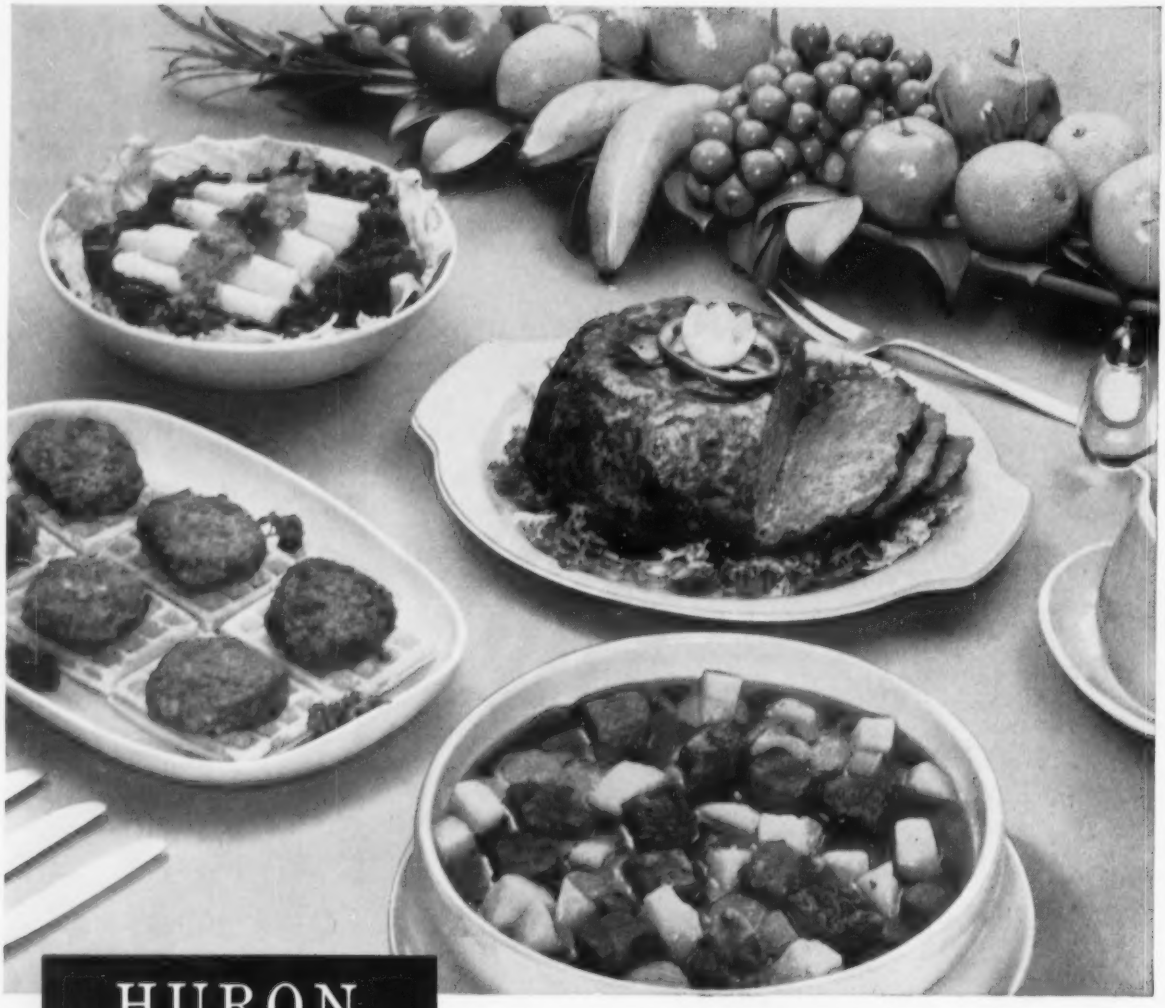

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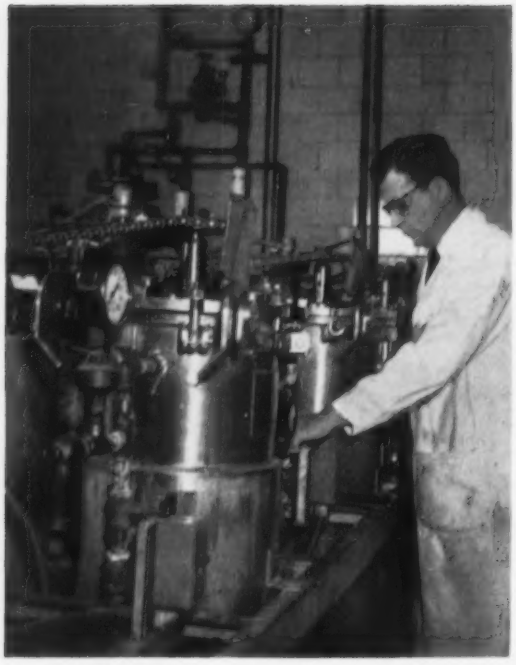

PILOT FERMENTERS, such as these, are used in research on new enzyme products.

pectin. Thus it causes marked reduction in viscosity and permits suspended materials to settle.

Pectic enzymes have three general applications:

1. If they are added to grapes, apples, or other fruits during crushing or grinding, yield of pressed juice is increased. Wine from grapes so treated usually will clear faster when fermentation is complete, and exhibit a deeper, richer color.

2. Clear fruit juices are preferred by most consumers. The cloud, such as that in fresh cider, often is caused by material held in suspension by colloidal pectin. Unless this pectin is removed, filtration is difficult, if not impossible.

Safest way to remove this pectin without affecting color or flavor is to treat the juice with a pectic enzyme. Juice for jelly manufacture frequently is depectinized completely in this manner, since production is more uniform when a standard amount of pectin is then added. Thus, the variable quality and quantity of naturally occurring pectin does not interfere in this application.

3. Pectic enzymes are required in processing of high-density fruit juice concentrates or fruit purees.

For example, if apple juice is concentrated to 72 deg. Brix without removing pectin, it will gel. In most cases, juices are depectinized and filtered before concentration, but in others pectinase is allowed to act while the juice is being concentrated.

Another use for pectic enzymes is in speeding and controlling fermentation of coffee beans to remove their gelatinous coatings.[20] Formerly, this was accomplished by natural fermentation caused by microorganisms on the bean, but generally gave unpredictable results.

Other hydrolytic enzymes of interest include cellulase, hemicellulase, and pentosanase. These have not yet achieved major importance, due partly to lack of availability of high-potency products (particularly for cellulase).

There are numerous potential uses for these agents, such as in recovering cellulosic wastes and tenderizing cellulosic food products. However, any large-scale use must await greater availability of more active cellulase enzymes.

Hemicellulases are active in hydrolyzing certain gums. One application concerns prevention of gelation in coffee concentrates, where pectinase is only partially effective.

Pentosanase reportedly increases the yield of high-quality starch from wheat.[21]

Lipases, despite the importance of fats in foods, are not used extensively.

PROTEASES

Industrial proteolytic enzymes are obtained from fungal, bacterial, animal (pancreatin, trypsin, pepsin) and plant (bromelin, ficin, papain) sources.

For food use, they generally are mixtures of proteinases and peptidases, or in terms of more recent knowledge of their modes of action, endopeptidases and exopeptidases.[22] In simplified form, here are their major reactions:

$$\text{Proteins} \xrightarrow{\text{endopeptidases}} \begin{matrix}\text{Proteoses}\\ \text{Peptones}\\ \text{Polypeptides}\end{matrix} \longrightarrow \text{Amino Acids}$$

$$\text{Polypeptides} \xrightarrow{\text{exopeptideses}} \text{Amino Acids}$$

Proteolytic action is extremely complicated because of the complex structure of high molecular-weight proteins, which contain some 20 different amino acids joined by peptide linkages. Native proteins are not ordinarily attacked by proteases, but must first be denatured before enzymes can act upon them. Many proteolytic agents are quite specific in action (relative to which peptide linkages are hydrolyzed).[23]

With proper selection of enzyme, and conditions of time, temperature, and pH, either limited proteolysis or complete breakdown of most proteins to amino acids can be effected.

In baking, use of fungal protease supplements for bread and crackers offers many advantages. Mixing time may be cut, dough becomes more extensible, and there is a marked improvement in grain, texture, external characteristics, and loaf volume.

However, excess protease causes stickiness and slackness in doughs, plus a softening that results in coarse grain and texture, and impaired loaf volume. Hence, protease supplementation can best be carried out by the baker, who takes into account flour type and shop practice. Each flour may need a different combination of protease and α-amylase for best results in a given shop.[6, 8, 23, 24]

Beer and ale are "chillproofed" by use of protease enzymes.

Many of these beverages, unless enzyme treated, develop a haze caused by a protein-tannin complex when they are chilled. Chillproofing agents, containing pepsin, papain, bromelin, and fungal and bacterial proteases in various combinations, digest enough protein to prevent formation of this haze.[25] They are added to the beer during the finishing operation. (*Turn to p. 133*)

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Cereal foods are treated with proteolytic enzymes to modify their proteins. This offers processing advantages such as increased drying capacity, lower power requirements, and improved product-handling characteristics. These gains are brought about by "softening" and better "pliability" of the dough.

Cheese processing provides another application for proteases. Here, rennin[26] is added to coagulate milk protein so that curd can be separated from whey and made into cheese.

Meats are tenderized through the actions of proteolytic enzymes. Consumer products contain papain and bromelin as active ingredients.

Recent work[27] at the American Meat Institute has shown, however, that various proteolytic enzymes exhibit different actions with respect to degree and manner of attack on different meat tissues. It is believed that combinations of plant, fungal, and bacterial proteases may have an advantage over any single enzyme.

Use of tenderizers for fresh meats is not widespread, because of the packer's inability to distribute the enzyme uniformly throughout the carcass. However, these agents have considerable application in prepared meats. Here, they are added to meat cuts, and later are inactivated by temperatures reached during processing.

Protein hydrolysates such as condiments (soy sauce) and materials for special diets are obtained by extensive enzymic proteolysis. Acid and alkaline hydrolysis of proteins can also be employed, but enzymic processing has an advantage in that it requires only very simple equipment and does not cause destruction or racemization of amino acids. Choice of enzyme and extent of hydrolysis are very important where taste is a prime factor.

NON-HYDROLYTIC ENZYMES

At present, only two enzymes in this category have extensive industrial food applications. These are glucose oxidase and catalase.[28]

Glucose oxidase acts in presence of oxygen to convert glucose to gluconic acid and hydrogen peroxide, as shown by the following equation:

$$\underset{\text{(Glucose)}}{C_6H_{12}O_6} + O_2 + H_2O \xrightarrow{\text{glucose oxidase}} \underset{\text{(Gluconic acid)}}{C_6H_{12}O_7} + H_2O_2$$

This oxidase system has been used both for removing glucose and for removing oxygen.

In de-sugaring of eggs[29] before they are dried, removal of glucose by this system greatly enhances shelf-life of the dried product. It prevents "browning" and other deterioration of color and flavor.

With other foods and beverages, the problem in marketing is oxygen rather than glucose. Often, conventional antioxidants are not applicable because of flavor changes or ineffectiveness. However, glucose oxidase will protect items such as cheese, beer, carbonated beverages, and fruit juices.

With cheese, glucose oxidase and glucose are coated on the inside of the wrapper, where it contacts the cheese.[30] In the case of liquid products, glucose oxidase and a little glucose are simply dissolved in the items before packaging.

In canned soft drinks,[31] three major changes that may occur are loss of color, alteration of flavor, and can corrosion. Different flavors have varying susceptibilities to these changes, which are all related and may be traced to "head space" oxygen remaining in the sealed can. Incorporation of glucose oxidase greatly enhances keeping quality of susceptible canned soft drinks.

The second enzyme of commercial importance, catalase, is obtained from animal, fungal, or bacterial sources. It decomposes hydrogen peroxide as follows:

$$2H_2O_2 \xrightarrow{\text{catalase}} 2H_2O + O_2$$

In the combined glucose oxidase–catalase system, net reaction results in one mole of oxygen being consumed for each two moles of glucose oxidized.

$$2C_6H_{12}O_6 + O_2 \xrightarrow{\text{glucose oxidase—catalase}} 2C_6H_{12}O_7$$

In reality, glucose oxidase is a glucose dehydrogenase, and the reaction is more complex than shown.

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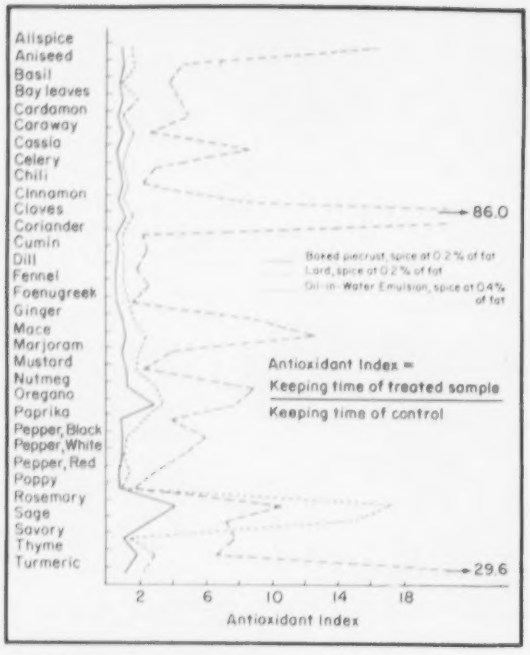
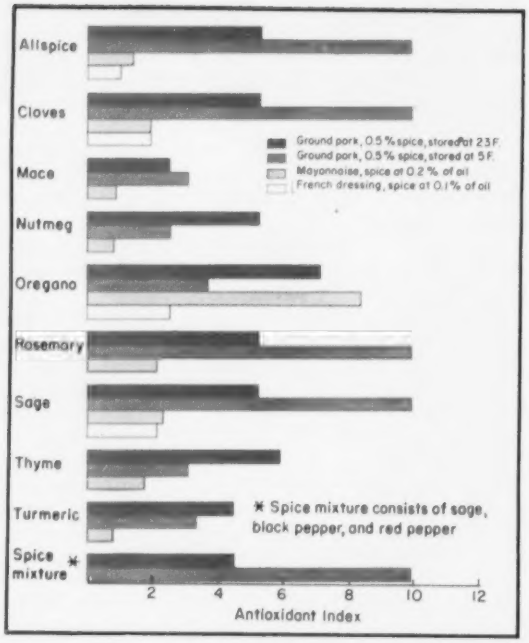


COMPOSITE GRAPH shows antioxidant values of common spices in various substrates. Note high effectiveness of cloves in oil-water emulsions, and their relative inactivity in baked piecrusts.



HOW SPICES affect stability of ground pork, mayonnaise, French dressing. Indices for allspice, cloves, oregano, rosemary, sage, and spice mixture in pork are minimum values since item was not rancid at end of test.

32 Spices Gaged as Antioxidants

Spices boost stability of many foods, but it takes tests to check their specific actions. This study pins down actual performance in typical products

J. R. CHIPAULT

Associate Professor of Agricultural Biochemistry, Hormel Institute (University of Minnesota), Austin

THAT SPICES act as antioxidants to curb rancidity in fats and fatty foods is well known. But just how effective a given spice will be in a particular product must be determined experimentally.

Thus, we at Hormel Institute launched a 4-yr. study to pinpoint the antioxidant properties of 32 common spices. Our tests covered the action of 78 samples in lard and several types of fat-containing foods.

Results (see charts) emphasize impossibility of predicting specific action of a spice from its performance in another product.

Computed effectiveness is expressed as an "antioxidant index"—ratio of keeping time for treated sample to that of its control. An index of 1 means that a spice has no antioxidant power, whereas values below 1 indicate pro-oxidant activities.

Activity in Lard

Ground spices were added to lard at a concentration of 0.2%, and fat stability was determined (A.O.M.). Here, we used lard as a substrate simply to provide a rapid screening, and to quickly classify samples as antioxidant, inactive, or pro-oxidant materials.

Of the 32 spices tested in this manner, only a single sample of ginger was found to be slightly pro-oxidant. Three others had slight antioxidant activity. In most cases there was little difference between antioxidant indices of various samples of the same spice.

This check showed that 21 were weakly antioxidant. That is, they increased keeping time of lard less than 100%. Two—rosemary and sage—were powerful antioxidants and extended stability many times.

To further check activities of soluble fractions, we successively extracted a sample of each spice with petroleum ether and 95% ethyl alcohol. Activity of each fraction was determined as above, and in only three cases (chili, cloves, and thyme) were their combined activities slightly greater than that of the ground spice. All other fractions were weaker, and 12 of them were actually pro-oxygenic.

Many antioxidants are effective when incorporated in fats, but lose this property when fats are used in baking.

To determine whether compounds that "carry-through" into baked goods are present in spices, stability

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of piecrust-type pastries, using lard and added spices as shortening, were tested. Cardamon, coriander, cumin, dill, fennel, and foenugreek were consistently pro-oxygenic in piecrusts.

Evidently, antioxidants in these were destroyed during baking, or compounds with pro-oxidant activity were formed. On the other hand, oregano, rosemary, sage, and thyme appreciably improved stability. Antioxidant power of oregano is approximately the same in piecrust as in lard alone, indicating that this spice contains a "carry-through" antioxidant. And rosemary appears to be more resistant to baking than sage.

Emulsions . . . Typical Foods

Spices often are used in foods in which fat is in contact with a water phase. Thus, we tested the various ones in a simple oil-in-water emulsion using corn oil from which natural antioxidants had been removed.

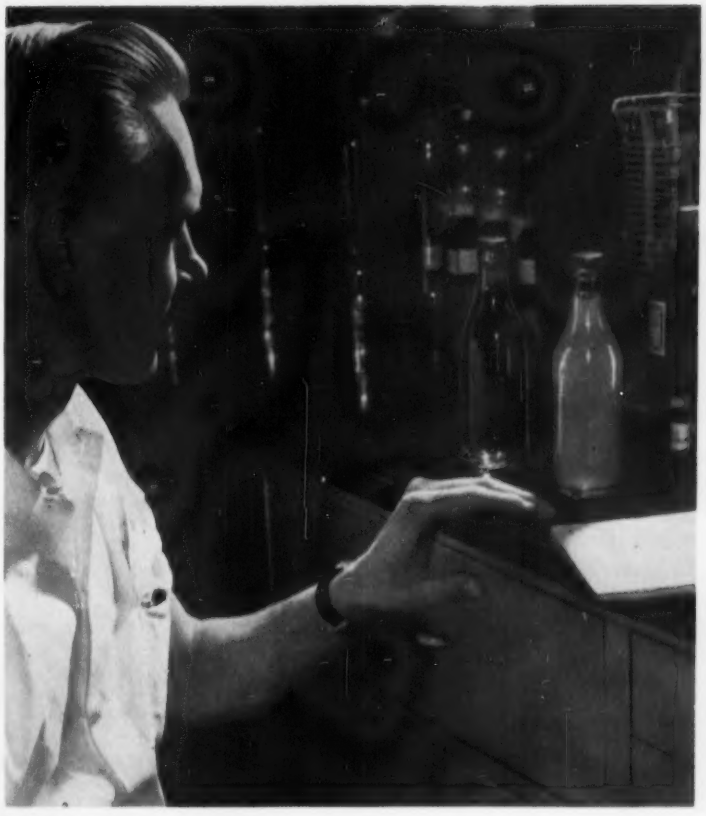
All spices except sage and rosemary were much better antioxidants in the emulsion than in lard. By far the best was cloves, which increased stability about 86 times. Then, in order of decreasing effectiveness, were turmeric, allspice, mace, and rosemary.

Several others, nearly ineffective in lard, were found quite active in the emulsion. Among these were cassia, cinnamon, allspice, cardamon, ginger, black pepper, white pepper, and savory, all of which had antioxidant indices of at least 5.

Several spices also were tested in: Ground pork stored at 23, and 5F., two types of mayonnaise (one with egg yolk, the other with whole eggs), and a separating-type French dressing. Mayonnaises were stored at room temperature in the dark, and French dressings in ovens at 98 and 145F.

Allspice, cloves, rosemary, and sage were outstanding in preventing fat oxidation in the ground pork. Samples were not rancid after storage for 36 weeks at 23F., or 96 weeks at 5F. Peroxide determinations indicated that samples containing cloves had oxidized very little.

In mayonnaise, most effective spice was orgeno, which had an antioxidant index of about 8.5. Cloves, rosemary, sage, and thyme approximately doubled the product stability. None was very effective in French dressing, although rate at which rancidity developed was cut approximately in half by cloves, orgeno, and sage.



PASSING THE EYE TEST: Here, the cloudy orange beverage (right) gets nod over clear one. Cloudiness simulates appearance of natural fruit juice, and brominated oils aid in stabilizing the cloud.

BROMINATED OILS Guard Beverage Cloud

Versatile weighting agents enable oil and water to mix—and stay mixed. Thus, they give citrus drinks sales-promoting cloud and taste

KARL M. BECK

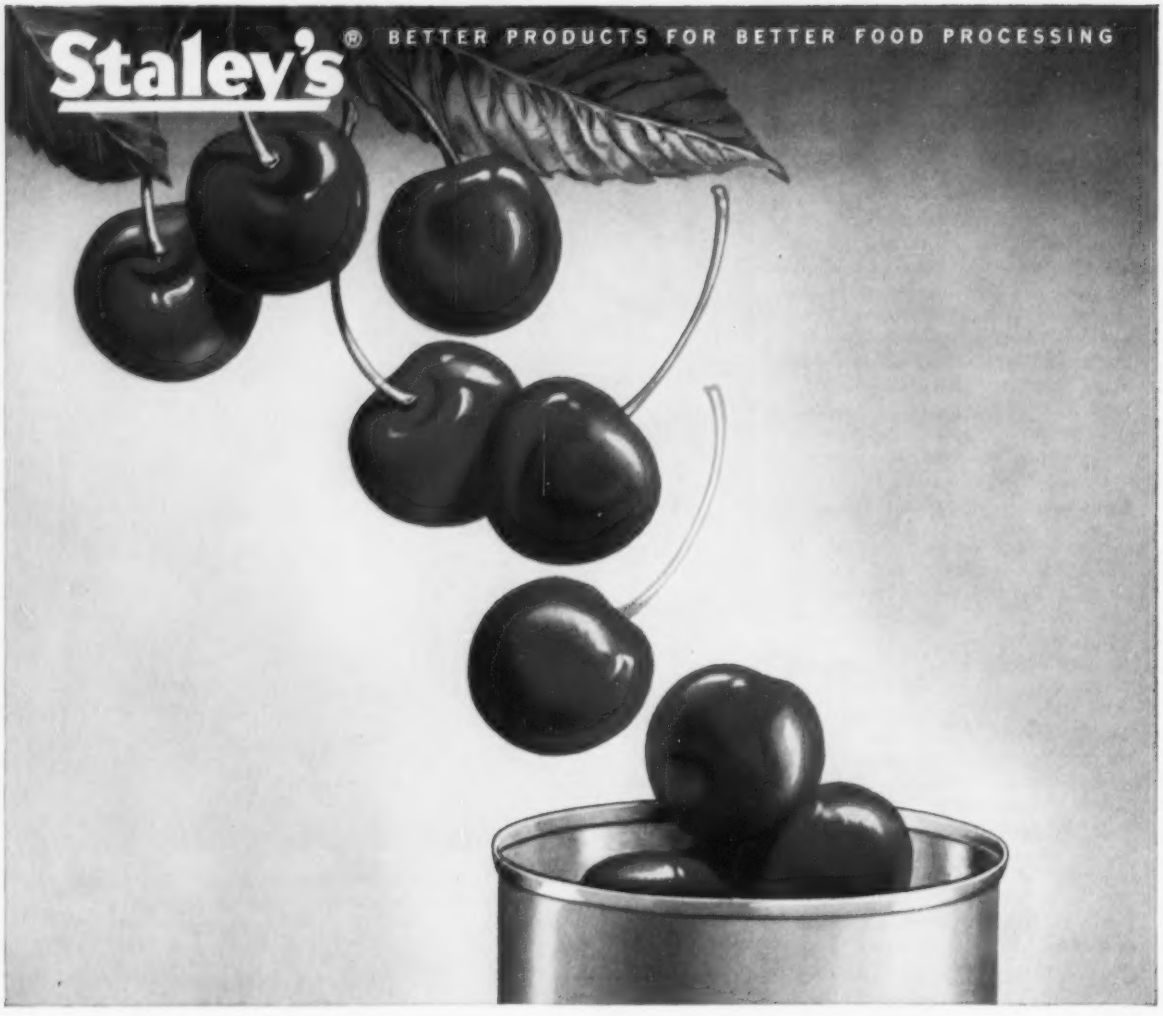
Chemical Sales Division, Abbott Laboratories, North Chicago, Ill.

FOR EYE APPEAL and inviting taste, cloudy citrus-flavored beverages have their flavoring oils suspended as stable clouds. And here brominated oils play a key role in quality control.

Properly formulated, these soft drinks give the highly desirable appearance of fruit juices, and their essential oils are uniformly dispersed for maximum taste effect.

Cloud stability is a problem because citrus oils are insoluble in water and have specific gravities of less than 1.0. A practical solution is to raise these gravities to 1.01-1.03 by addition of a dense brominated oil.

Such density modifiers are made by brominating natural oils, as olive, sesame, corn, soya, and apricot ker-



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How to Make Stable Flavor Emulsions

Lemon-Lime	
California lemon oil	4 lb.
Distilled lime oil	1½ lb.
Five-fold lemon oil	1 lb.
Brominol (sp. gr. 1.24)	approx. 4½ lb.
Adjust specific gravity of oil mix to 1.01.	
Gum acacia	10 lb.
Water	4 gal.
Rub oil and gum, add water, homogenize.	
FD &C Blue No. 1	½ oz.
FD &C Yellow No. 5	20 oz.
Propylene glycol or glycerin	2½ gal.
Water to make	25 gal.

Add colors and glycol to water, then add to oil and gum mixture. Make up to 25 gal. with water. Mill or homogenize to assure good dispersion of oil.

Use 2 oz. of emulsion and 3 oz. of 50% citric-acid solution to 1 gal. of 32 deg. Be syrup.

Orange Emulsion	
Mandarin orange oil	½ lb.
Tangerine orange oil	1 lb.
Florida orange oil	3 lb.
California orange oil	2 lb.
Five-fold orange oil	2 lb.
Terpeneless orange oil	2 oz.
Densitol (sp. gr. 1.33)	5 to 5½ lb.
Adjust specific gravity of oil mix to 1.02-1.03.	
Gum acacia	10 lb.
Water	4 gal.
Rub oil and gum, add water, homogenize.	
FD &C Yellow No. 6	22 oz.
FD &C Yellow No. 5	5 oz.
FD &C Red No. 1	9 oz.
Propylene glycol or glycerine	2½ gal.
Water to make	25 gal.

Add colors and glycol to water, and process as per lemon-lime.

Use ¼ oz. of emulsion and 1½-2 oz. of 50% citric-acid solution to 1 gal. of 32 deg. Be syrup.

nel oils. Their iodine numbers (index of unsaturation) determine amount of bromine that can be added and, therefore, the specific gravities.

Agent Details

These oils offer several important advantages in this application. Because they are of high specific gravity, only small amounts are required. Furthermore, they do not interfere with citrus flavors.

Brown colored liquids, they are neutral and should be almost odorless and tasteless. Although insoluble in water, they are miscible with citrus oils.

Specific gravity (their most important physical property) should be standardized. Rancidity is their most common off-taste. Here, a check of total acid content is a good index of quality.

Shelf-life is not a practical problem. Properly made, a brominated oil should keep up to two years in a closed container. However, it gradually oxidizes when exposed to air and become rancid. So it's advisable to use the oil within a few months after opening container.

Making Citrus Emulsions

Formulation of two typical citrus emulsions is outlined below. They are called 2-oz. emulsions because 2 fl. oz. are used per gallon of sugar syrup for making a particular beverage concentrate. However, these emulsions can be made more concentrated or more dilute.

Generally, a mixture of essential oils is used in formulating a flavor emulsion, the exact blend depending upon the particular product.

First step is to combine citrus and brominated oils. For maximum stability, specific gravity of the mix usually is rated at about 0.02 units less than that of the finished beverage. But the optimum figure is best determined experimentally.

After combining the oils, specific gravity is checked with a hydrometer or by weighing a measured volume. Measurement should be made at standard temperature, or a temperature correction applied. If necessary, citrus or brominated oil is added to get required gravity.

Second step is to combine oil and suspending agent. Gum acacia is commonly used, although other gums are also suitable. They can be slurried or rubbed, using a minimum of water. Or the gum can be dissolved in water, and the solution combined with the oil. Then, mixture is run through a colloid mill or homogenizer to disperse the oil and coat the droplets.

Finally added are colors, propylene glycol or glycerin (as a preservative), and water (to make total volume of the batch). Product is milled until a uniform emulsion is obtained (particle size 1-2 microns). This may require 2 or three passes, depending on equipment used and formula being processed.

Cloud Stability

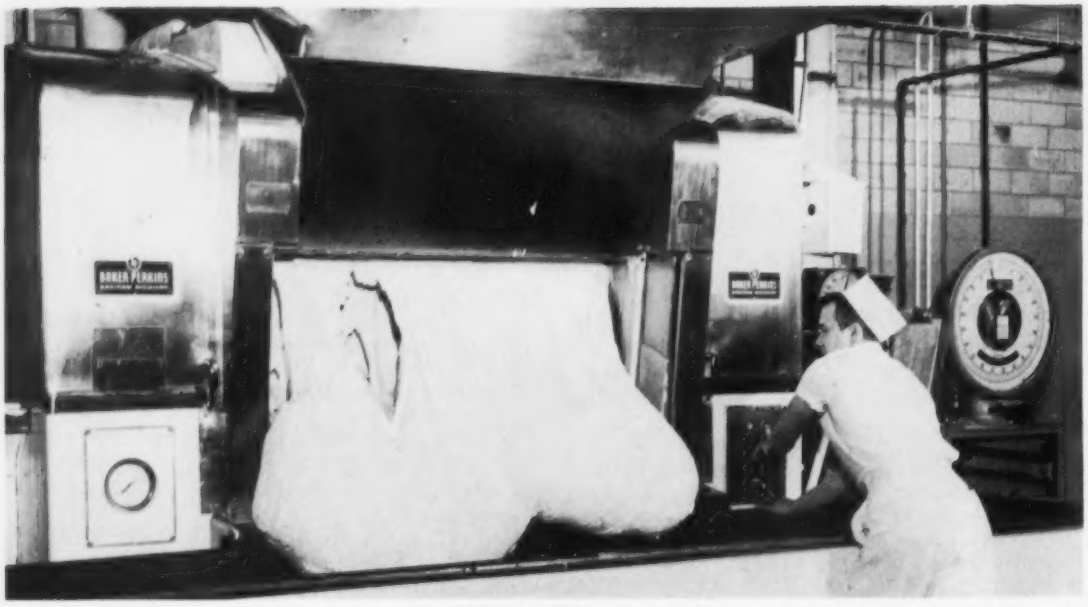
Oil-water emulsions tend to break up after several months. However, certain factors greatly enhance cloud stability.

Proper specific gravity of oil mix is important. If it is out of balance, an emulsion will either ring or settle fairly rapidly, depending on whether the oil was too light or too heavy. And small droplets remain suspended (by Brownian motion) much longer than larger ones.

Sunlight and heat are detrimental to citrus emulsions and beverages. Consequently, they should be stored in fairly cool rooms and protected from direct sunlight. A beverage that keeps for 6 months in a dark room will break up in 2 weeks when exposed to full sunshine.

First use of brominated oils was about 30 yr. ago. Brominated apricot kernel oil was introduced in 1946, and since then several other products have appeared on the market. Recently, brominated sesame oil replaced the apricot kernel oil, although both are quite similar.

A word about toxicity: Extensive studies have been conducted on our company's brominated olive oil (Brominol) and on other brominated oils in use. Tests revealed that these oils are harmless in the amounts used in beverages.



HOW YOU MIX your dough ingredients is a vital factor in getting greatest value from specific flour properties. This sanitary, double-arm unit turns out five properly blended batches per hour. It's Freon-refrigerated.

FLOUR TYPES

And How to Use Them

The two basic wheats provide many kinds of flours, each with its own distinct properties. Key problem is choosing the "proper flours to fit the foods." And the closeups given here—of the plains (hard and softs) and the durums—show you the way

OSCAR SKOVHOLT
Director of Laboratory, Quality Bakers of America Cooperative, Inc., New York City

VITALLY IMPORTANT is the care you exercise in selecting the specific flours that have just the right characteristics for preparing your quality foods.

- **For yeast leavened goods such as bread and rolls, you will need a flour that produces a dough with good gas-retaining properties.**
- **For chemical leavened products such as cakes and crackers, a low gluten type is best.**
- **And for alimentary pastes a cohesive, elastic dough such as that produced by durum wheat flour is paramount.**

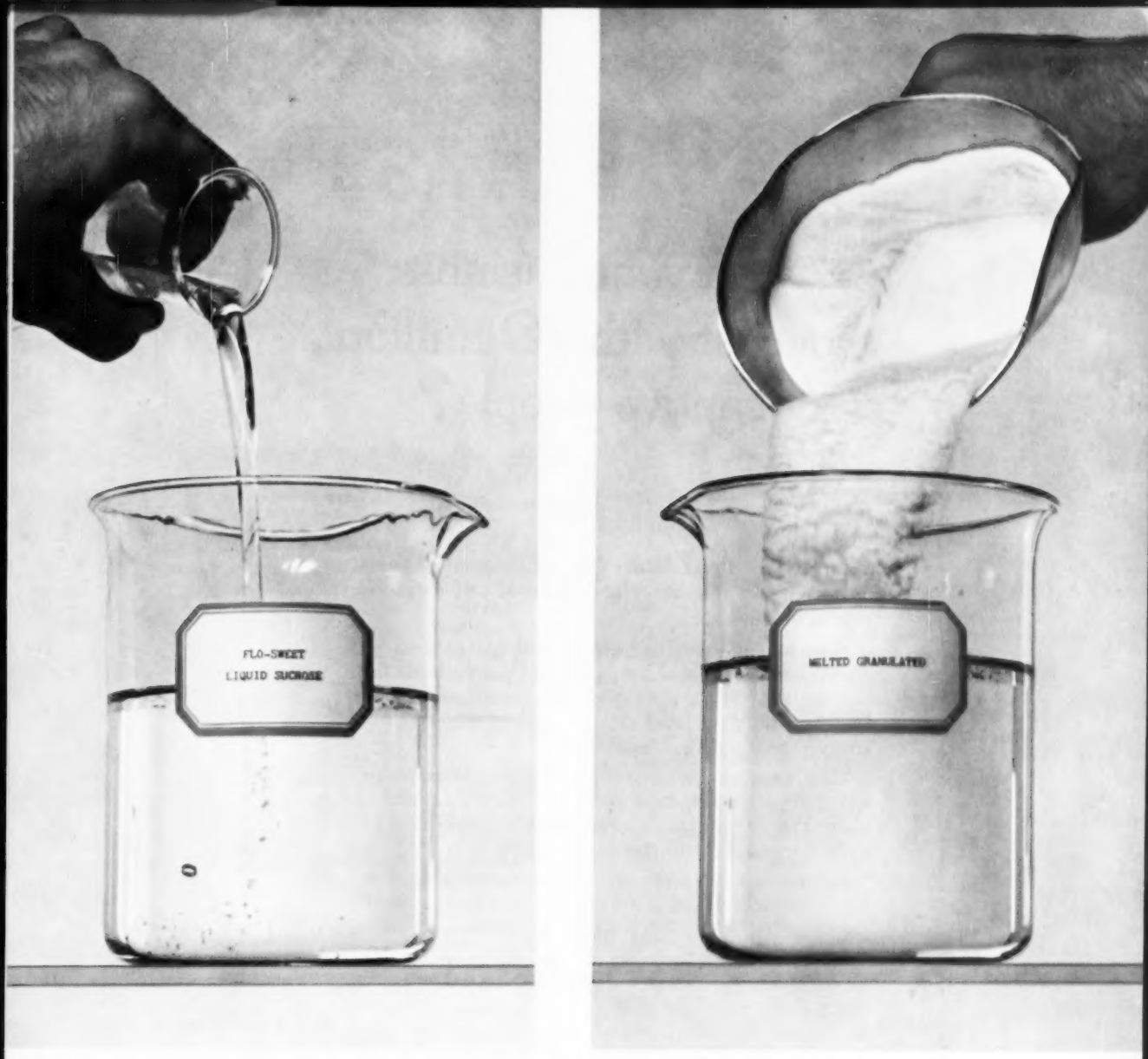
To aid you in selecting the most satisfactory ones for your products, we will discuss some of the unique functioning characteristics of flours. Also, we will point out how various types differ in composition and usefulness for different kinds of baked goods.

Importance of Gluten

Plain flours owe their usefulness to their principal proteins—gliadin and glutenin. These have the unique property of forming a gum-like mass when stirred with water, and this is called gluten. Doughs made from such flours possess good gas-retaining properties due to the colloidal films that are developed during the mixing operation.

Making good cakes and yeast leavened goods requires development of the greatest possible number of small gas pockets in the batter or dough. These can then expand with a minimum of rupturing of cell walls during baking. The greater pressure and larger dough expansion resulting from use of yeast means that flours used for bread and rolls must give stronger gluten walls than those for cookies and crackers.

Hard wheat flours are especially



HERE'S Quality YOU CAN SEE!

What could look purer than the sparkling white crystals of granulated sugar?

It has long been the custom to compare the color of granulated—*dry*—with liquid sugar. But true comparison can be made only when the granulated is dissolved. These photographs, of samples in 1000-milliliter beakers, show what can happen: the brilliant white granulated actually shows much more color than Flo-Sweet! The illustration at right shows the color of a mixture of *three* commercial granulated sugars.

What does this mean to you? Just this: You can get a good idea of the purity of a sugar by its color, since color is a fair indication of refinery efficiency.

With the current trend toward higher and higher quality in food products, only the best ingredients are good enough for the discriminating food producer. Whether you judge quality on the basis of color, taste, or laboratory analysis—we urge you to compare Flo-Sweet quality with any other sugar, liquid or granulated.

For here's true sugar quality . . . quality you can *see!*

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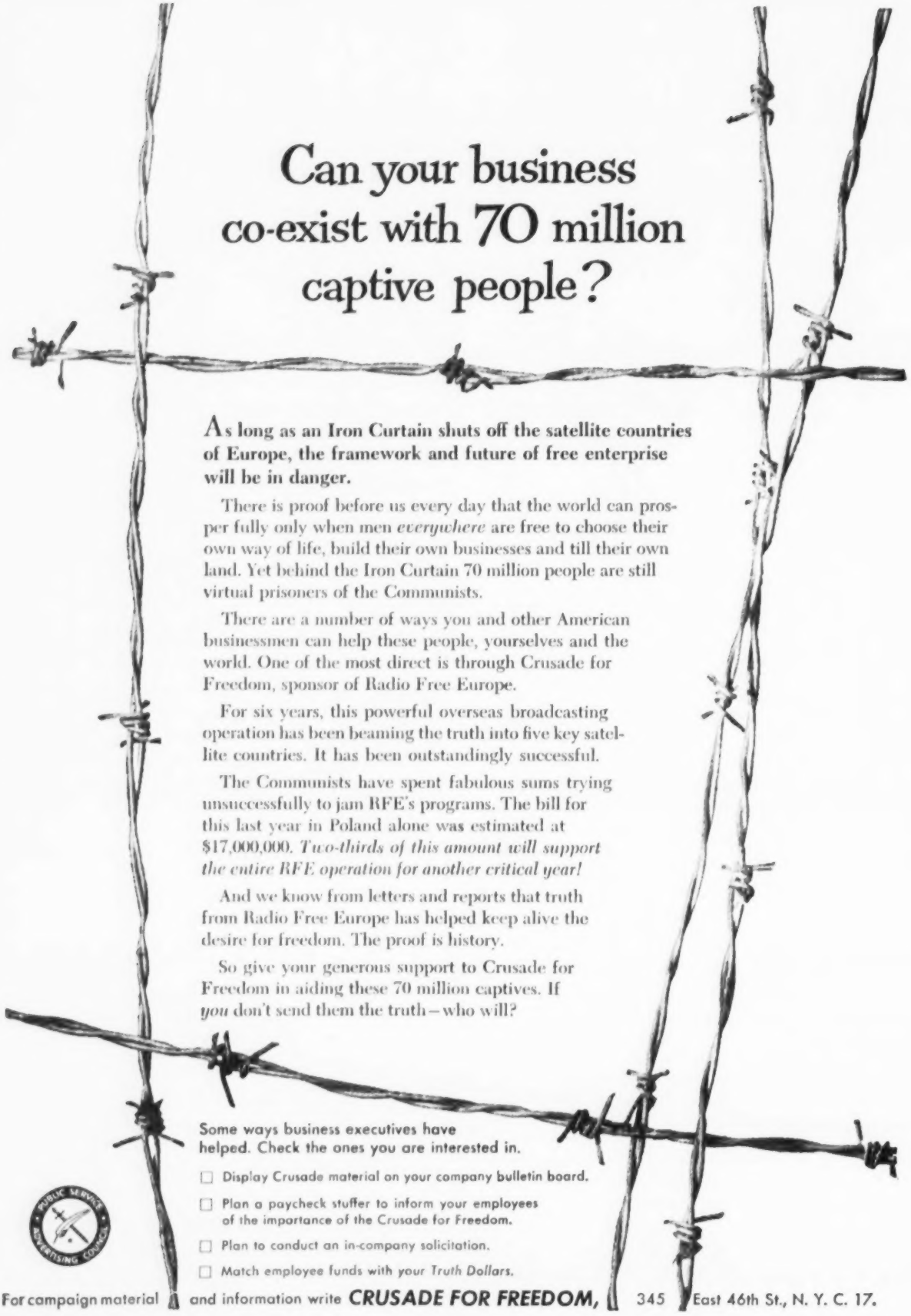

As long as an Iron Curtain shuts off the satellite countries of Europe, the framework and future of free enterprise will be in danger.

There is proof before us every day that the world can prosper fully only when men *everywhere* are free to choose their own way of life, build their own businesses and till their own land. Yet behind the Iron Curtain 70 million people are still virtual prisoners of the Communists.

There are a number of ways you and other American businessmen can help these people, yourselves and the world. One of the most direct is through Crusade for Freedom, sponsor of Radio Free Europe.

For six years, this powerful overseas broadcasting operation has been beaming the truth into five key satellite countries. It has been outstandingly successful.

The Communists have spent fabulous sums trying unsuccessfully to jam RFE's programs. The bill for this last year in Poland alone was estimated at $17,000,000. *Two-thirds of this amount will support the entire RFE operation for another critical year!*

And we know from letters and reports that truth from Radio Free Europe has helped keep alive the desire for freedom. The proof is history.

So give your generous support to Crusade for Freedom in aiding these 70 million captives. If *you* don't send them the truth—who will?

Some ways business executives have helped. Check the ones you are interested in.

- ☐ Display Crusade material on your company bulletin board.
- ☐ Plan a paycheck stuffer to inform your employees of the importance of the Crusade for Freedom.
- ☐ Plan to conduct an in-company solicitation.
- ☐ Match employee funds with *your Truth Dollars.*

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suited for yeast-raised products because of their high protein percentages that produce strong gluten when made into dough. Soft wheat flours produce relatively little gluten, and of an easily extended type, so are chiefly used for chemically leavened products.

In making yeast leavened products, doughs are allowed extended fermentation periods to obtain a mellowing of the cell walls that retain the gas. In this way, they form the structure of the dough and of the final baked product.

Obvious purpose of the mellowing is to allow expansion to take place with a reduced pressure within the system. Such a lessened pressure reduces the tendency for cell walls to burst and create holes that make for irregularity in the structure of the baked product. But gluten mellowing must occur without an appreciable weakening of the cell walls from the standpoint of gas-retention properties.

Here, the art of the baker, and the science of the technical advisor, are called into play. Characteristics of flour used, composition of dough, and type of product that is desired are all factors in determining how best to achieve the desired mellowing during the mixing and fermentation.

Natural enzymes are present in flour and are also added, as other dough ingredients, to aid in this mellowing action and to maintain a properly controlled fermentation reaction. As wheats differ appreciably in their enzyme content, the miller exercises control over this in his blending and processing operations.

Maturing, Bleaching, Enriching

An additional aid is available to the miller through use of permitted maturing and bleaching agents. Need for maturing action varies with the age and type of wheat and, also, with the time the flour will be allowed to age before it is used.

Chlorine dioxide is the common maturing agent for hard wheat flours, and chlorine is most frequently used for the soft wheat types. Higher levels of this chemical have been found necessary for short patent flours.

Although these agents have some bleaching action, benzoyl peroxide is generally used whenever a customer desires a grade of flour that is relatively free from the yellow pigments present in the natural product. This effectively removes these pigments, and gives a relatively white flour that is almost universally desired for production of baked goods other than whole wheat and rye breads.

Addition of small amounts of potassium bromate as an oxidizing agent is also allowed. It is used on relatively strong bread flours, and has been most commonly added to high gluten and clear types. It is more valuable in flour from some wheat crops than from others. Incidentally, its addition is probably more common this year than at any previous time.

Other additives, which have nothing to do with flour performance from a physical standpoint, are the so-called enriching ingredients. These are required for production of enriched flour and enriched bread. The factors involved are thiamine (vitamin B-1), riboflavin (vitamin B-2), niacin, and iron.

Most of the bread flour sold for family use, and nearly all of the white bread produced by the baker, is now enriched. In the latter case, some of it comes from use of enriched flour. A more common practice, however, is for the baker to add it as a separate concentrate, or in tablet form.

DURUM FLOURS

They Find Many Uses In Making Macaroni, Noodles

JAMES J. WINSTON,
Director, Jacobs-Winston Laboratores, Inc., New York City

LARGELY USED in the manufacture of alimentary pastes are the farinaceous ingredients derived from durum wheat. These comprise the two basic materials, semolina and durum flour.

Former is used in making macaroni products. It is an unbleached middling material that contains not more than 3% flour, and has a protein content of 11½-12½. It produces a cohesive, elastic dough with excellent cooking qualities, and light yellow color.

Durum flour is employed primarily for noodle manufacture. It has a maximum of yellow color, and a protein content of 12-13%. When mixed with egg ingredients it produces a very smooth and cohesive dough.

At present, most of these materials are enriched to comply with the Federal Standards of Identity.

Blending Reduces Variations

Most important difference in flours stems from variations in quantity and quality of gluten that they produce during dough-making. Accordingly, a good miller attempts to maintain maximum uniformity by doing a great deal of blending of available wheats.

Each large tank or bin, as held in storage, contains a blend of wheats having similar composition and characteristics. A mill mix is then drawn for each day's operations, in predetermined proportions from several bins, so that the same source of supply can be used for long periods.

In making blends, a miller pays considerable attention to the protein percentage of the wheat as an indicator of strength characteristics. He also takes into consideration the wheat variety and producing area. Factors involved in the latter are fertility of the soil, prevailing temperature conditions, and amount of rainfall during the particular growing season.

But even from the same mix, a considerable difference in flour characteristics is possible. This is largely due to variations in extraction. Milling of ordinary white flour involves separation of the outer branny layers from the white (endosperm) part of the wheat berry. This is done by successive grinding and sifting operations.

All of the streams produced during milling are divided into two basic fractions—flour and mill feed. But each of these may vary appreciably in composition. The flour

TABLE I—ORIGIN AND YIELD of Different Types of Wheat

Class	Where Grown	Percent of Crop
Hard red spring	N. Dak., S. Dak., Mont., Minn.	15–25
Hard red winter	Kan., Tex., Okla., Neb.	40–50
Soft red winter	Mo., Ill., Ind., Ohio, Pa.	15–25
White	Wash., Ore., Calif., Ida., N.Y., Mich.	8–12
Durum and red durum	N. Dak., S. Dak., Mont.	6–8

streams show a considerable variation in their content of fibrous and mineral matter from the branny layers of the wheat kernel, and also differ in the proportion of the germ that they contain.

Latter is higher in fat and minerals than the endosperm or floury portion.

Because of these differences, mill and bakery chemists use ash percentage as the best available measure of the degree of extraction of a flour.

In addition to the range in mineral content in different streams, there is also a difference in protein percentage. The portion most free from bran and germ components is also the lowest in protein, but with a different gluten quality than is found in those streams high in branny material. Gluten is somewhat more elastic in the low protein flour, since germ and bran fractions have some mellowing effect.

Grades of Flour

If a miller combines all flour streams into one material, this is designated as a "straight" grade. When dealing with hard wheat flours, the term "short patent" indicates use of about 80% of those flour streams with the lowest ash. The term "medium" patent describes a product that combines streams totaling some 85-90% of total flour output.

The designation, "standard patent," is usually applied to those containing 95-97%, and when short patents are produced, the remaining output of the mill is combined to produce another type known as "clear" grade.

Each grade has advantages for certain uses.

WHEAT is conveyed to large storage bins, where it is blended with other receipts of similar characteristics to insure maximum uniformity of flours.

A short patent flour will produce the whitest loaf as far as crumb color is concerned. Medium or standard patents are a little higher in protein, and usually tend to give somewhat larger loaves.

With such flours, the doughs are often said to have better "tolerances" due to presence of the clear portion. This means that there is less variability in the baked product due to minor changes in formula, or in the dough mellowing through fermentation and mixing.

Clear flours are particularly useful for blending with whole wheat or rye flours in the production of dark breads. They are high in protein and have a relatively mellow type gluten that works well when mixed with dark flours.

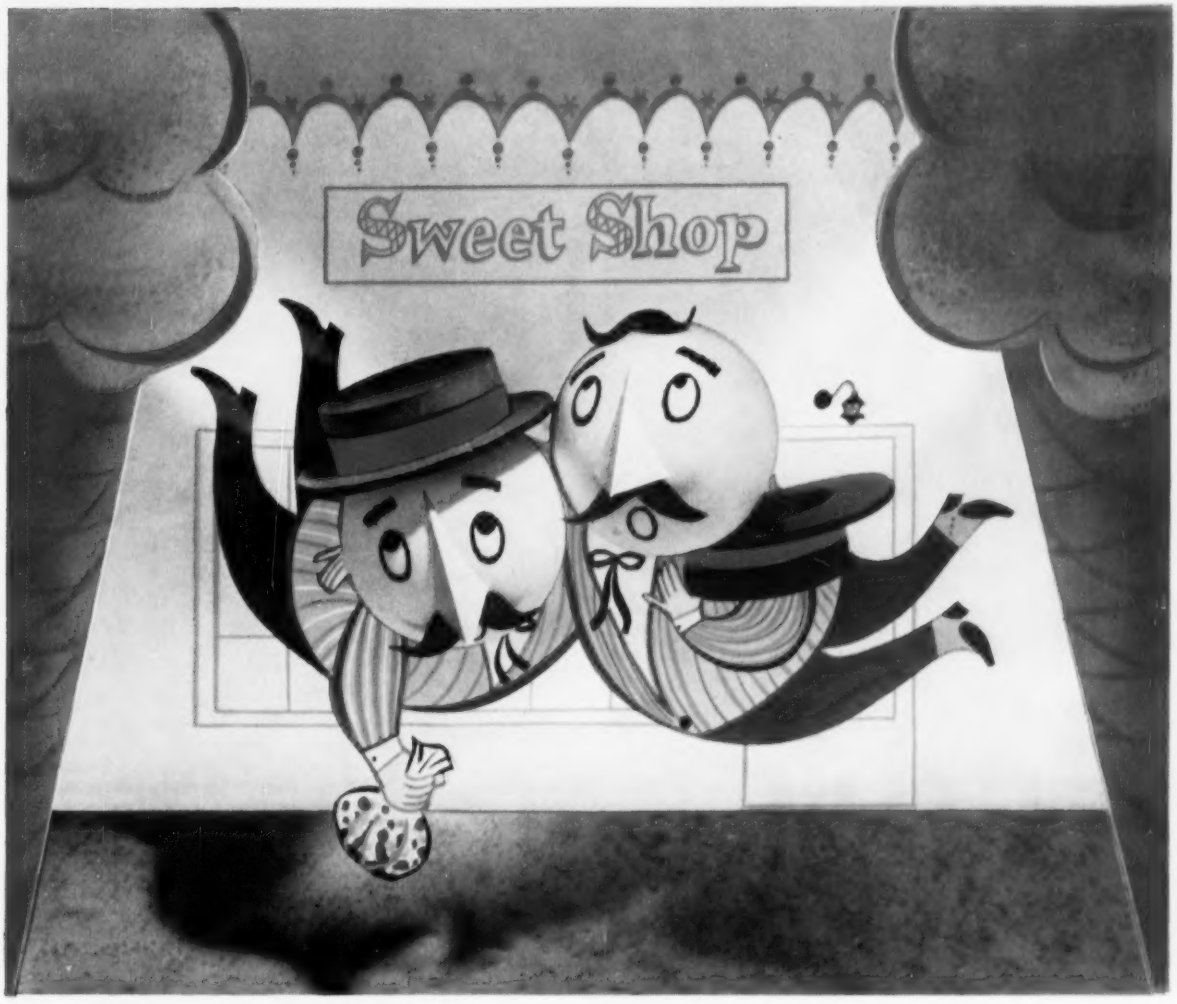
Breakdown as to grades is somewhat different with flours from soft wheats. To produce the richest and most delicate cakes, it is advisable to use only about 40% of those flour streams that are lowest in ash and protein.

This grade is designated as the "super-short" flour. It is especially suitable for making so-called "high-ratio" cakes that are above average

TABLE II—COMPOSITION AND PRINCIPAL USES of Current Types of Flour

Flour Types	Protein Levels, Percent	Ash Levels, Percent	Uses
Spring wheat patents	11.2–14.0	0.38–0.47	Pan bread, rolls, sweet goods
Spring wheat straight grades	11.6–14.8	0.47–0.50	Same plus hearth breads
Spring wheat first clears	14.5–17.0	0.60–0.80	Rye, wheat and specialty breads
Hard winter patents	11.4–13.6	0.37–0.46	Pan bread and rolls
Hard winter straight grades	11.8–14.5	0.46–0.49	Pan bread and rolls
Hard winter first clears	14.0–16.0	0.60–0.70	Rye, wheat and specialty breads
Soft winter short patents	7.0–8.5	0.29–0.33	High ratio cakes
Soft winter longer patents	7.5–9.0	0.32–0.37	Cakes, cookies, crackers
Soft winter straight grades	8.0–9.5	0.36–0.43	Cookies, crackers, pies
Soft winter first clears	9.5–10.5	0.45–0.55	Cookies, pies
Semolina	11.5–12.5	0.64–0.72	Spaghetti, and macaroni products
Durum flour	12.0–13.0	0.60–0.75	Egg noodle products

DOW



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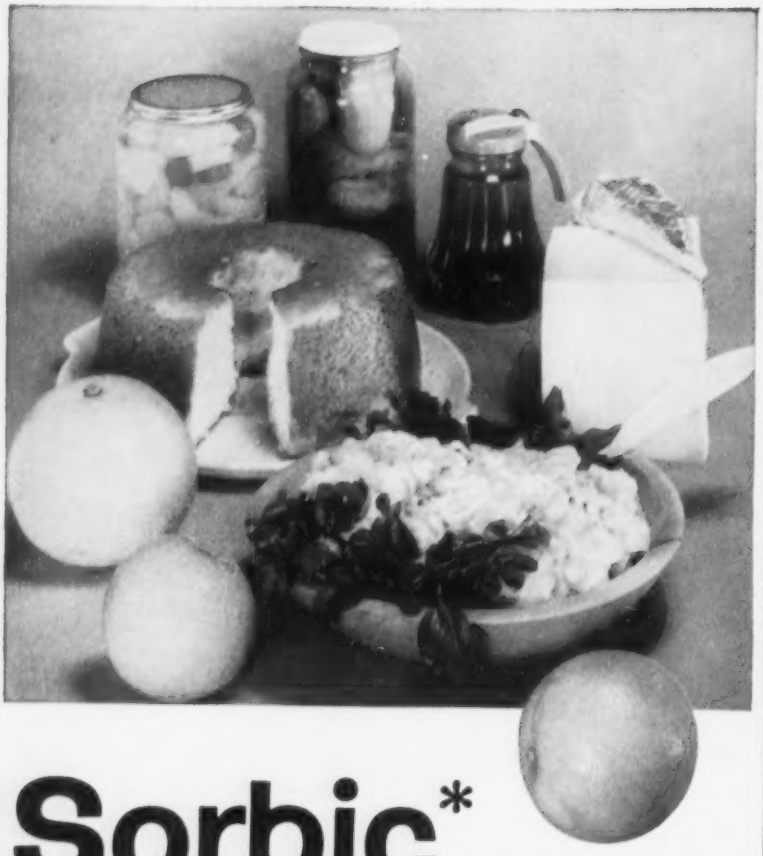

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in content of sugar and shortening.

When this type flour is being made, the remaining 60% of the streams may be combined to form a product that is appreciably higher in ash and protein than the other streams. However, this difference is not as great as that between ordinary patent and clear flours from hard wheat. It is often rated as desirable for use in certain cracker production and for pie crusts.

Patents longer than 40% are called "second-quality" cake flours. These may be fully as useful as the very short patents for production of certain types of cakes and cookies.

Wheat Varieties

Variations in composition and characteristics mentioned above are due to differences in extraction only, and without any change in the wheat mix. But the principal differences in flour properties are due to the type of wheat used in their preparation.

There are three recognized botanical species of wheat in this country —Triticum vulgare (common), T. durum (amber and red durum), and T. compactum (white and red club). Only a small percentage of the latter is produced, so this type can be disregarded from the standpoint of commercial importance.

Common wheats are classified into four major groups—hard red spring, hard red winter, soft red winter, and white wheats (both winter and spring). The winter wheats are sown in the fall for harvest during the following summer, whereas spring wheats are sown during that season and are harvested during the same year.

Table I lists the types, along with the states in which they are principally grown. Also given is the approximate percent of different types grown in an average year. This will vary considerably from year to year, depending on climatic conditions during the growing season and the acreage planted in each area.

For reasons already indicated, soft red winter wheats are used almost entirely for making chemically leavened products.

Of major interest to the bread baker is the quality of the available hard spring and hard winter wheat flours. There is considerable dispute as to the relative merits of the two. And bakers so located that they can most easily and economically use one of them will try to find arguments to justify the choice of that type flour.

However, it is generally conceded

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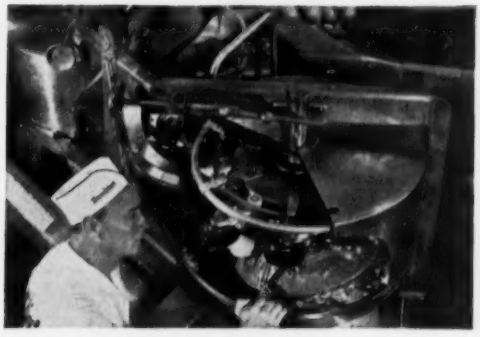
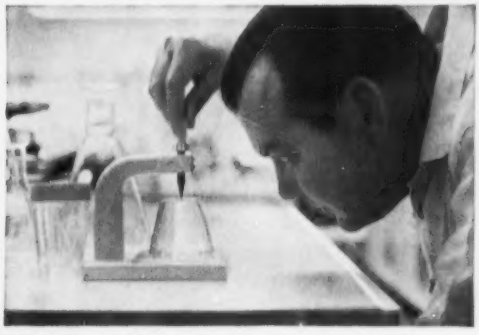


Utmost cleanliness is the watchword at Exchange Products plants. Everything has that "just washed-down" look. Every four hours, extraction equipment is completely cleaned. Every third day, the entire plant closes down for a thorough washing.



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The world's largest citrus research department is maintained by the Sunkist Growers to develop new growing methods, to improve manufacturing processes, and to perfect better products. Today, with a backlog of more than 60 years experience, Sunkist has accounted for 118 separate U.S. patents.

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that the average spring wheat flour will have somewhat greater "strength" than the winter wheat type. This usually means that the former requires extra mellowing through increased fermentation and mixing treatments of the doughs. A somewhat greater tolerance to variations in handling, as well as improved keeping quality of baked products, is usually obtained with this type.

Spring wheats have traditionally been somewhat higher in protein than winter wheat, but this spread has been narrowing in recent years, with little average difference in the 1956 crop. The margin may actually be in the other direction at present.

As to the other common index used in flour classification–ash level –there is very little difference due to wheat type. Flours of different extraction show nearly the same range in this factor, except that the clear grades from winter wheats are not as high as comparable grades from spring varieties.

A common practice in many bakeries is to blend spring and winter wheat flours for the regular types of bread. But for the most hearth breads and hard rolls, there is a rather universal preference for spring wheat flours, and those that are above average in protein content are commonly used. For the clear grade of flours used in dark breads, there is a pronounced advantage for the type made from spring wheats.

Table II indicates approximate ash and protein levels in some of the major flour types currently on the market. Also listed are the primary products in which each is used.

Quality Control

Ash, protein, and moisture levels represent the principal determinations as made in flour evaluation. Moisture level of freshly milled flour is relatively constant with a maximum of 15% being allowed by federal standards. There is a fairly definite level of moisture in the wheat that can be used to best advantage in milling practice in order to obtain maximum yields and flour quality. This gives flour that nearly always contains 14-14.5% moisture content.

Measurements of diastatic activity level are also important in evaluating flours for yeast-leavened products. This is most commonly done by determining the gas production rate over a 5-hr. period for a flour-water-yeast dough. Tests for maltose level

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may also be used. Most flours of this type are adjusted to nearly the same level as regards diastatic activity by additions of malted flour during the milling operation.

In spite of this control, many bakers find it advisable to boost the diastatic activity level in doughs for much of their production. This was formerly done by adding malt extracts. Now, however, fungal enzymes, which contain both diastatic and proteolytic enzymes, have largely replaced the malt. They are fully as effective as malts, and the doughs are less adversely affected by a possible over-dose.

Additional Checks

Other physical tests are also made in flour evaluations. One of these involves a measurement of the required power input during the mixing of a flour-water dough. A somewhat comparable test, as made on flours that are to be used for chemically leavened products, is the measurement of viscosity on a dilute flour-water suspension. Measurements of pH level are also important on such flours.

A final and most important test involves the making, on a laboratory scale, of the baked product for which the flour is to be used commercially. This is followed by an evaluation of its characteristics, though there is some difference in the procedures used for such tests.

Many other tests and procedures are occasionally used, in the routine checking of flour properties or in research departments, while attempting to find the reason for different flour performances. —*End*

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CANADA: Stange-Pemberton, Ltd.—New Toronto, Ontario

AN EFFECTIVE WAY TO DEVELOP VALUABLE GOOD WILL FOR YOUR COMPANY

...and help to do a life-saving job at the same time

You can achieve lasting good will for your company—the kind of good will that results in friendly relations with every group in your community. And you can help to save precious lives at the same time, by putting your company's efforts behind the nation-wide campaign against traffic deaths.

During 1956, the national total of highway deaths was over 40,000—the highest figure in our history. The cost to the country of these wasted lives is incalculable.

But the picture wasn't entirely black. In many areas—in small towns and big cities—the terrible upward trend was reversed.

This was accomplished by community action—by business leaders, civic organizations, church, fraternal and PTA groups joining together with law enforcement agencies in an all-out attack on traffic deaths.

The figures prove it. Wherever people get together to do something about traffic safety, *deaths go down.*

BACK THE ATTACK ON TRAFFIC ACCIDENTS!

Your company can perform an invaluable service for your community, and for the country as a whole, by pitching in and helping in this life-saving crusade. For full information on what you can do — and how you can do it—write The National Safety Council, Chicago 11, Illinois.

Published in cooperation with
The National Safety Council
The Advertising Council

CANADA: Stange-Pemberton, Ltd.—New Toronto, Ontario

ANNOUNCING

STABILIZER 37

a new cold swelling starch

STOP COOKING PIE FILLINGS

NEW **STABILIZER 37** is a cold swelling starch for fruit and soft type pie fillings. Eliminates cooking and cooling. Also saves labor, time, fuel. Requires no special equipment.

NEW **STABILIZER 37** offers everything:

• Exceptional clarity • Sparkling color • Smooth creamy texture
• Improved fruit appearance • Cooked starch body

NEW **STABILIZER 37** is simple to use. Moreover, it can eliminate cooking many frozen foods. Write for a sample, more information and suggested formulas.

NOW AVAILABLE FROM YOUR BAKERY SUPPLY HOUSE.

National
STARCH PRODUCTS INC.

270 Madison Avenue, New York 16 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11

PROGRESS REPORT

What is happening to sugar?

One of the most interesting trends in public thinking today is the changing attitude toward sugar.

What's happening is certainly of major importance to anyone involved in making, distributing, or retailing foods and beverages which use sweeteners.

Just what *is* happening? The most graphic example is the recent strong upswing in candy sales.

Quoting *Candy Industry and Confectioners Journal*, November 13, 1956:

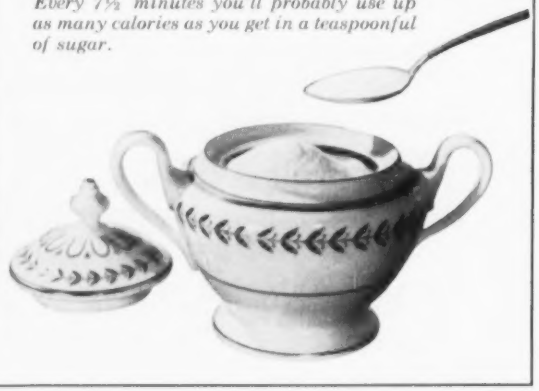
"It is our considered belief that the principal reason for the healthy sales gains in evidence since July is the strong breakthrough in the 'faddists' front.
". . . We credit the accomplishment of this major break-through to Sugar Information, Inc., and its very intelligent, excellently promoted campaign which is now in its third year."

We want to assure you that our advertising will continue—and with increasing momentum. You will be seeing more and more of our advertisements in major-city newspapers and in Life, Ladies' Home Journal, Time, New Yorker, Sunset, and Reader's Digest.

We feel there is every reason to believe the current trend to sugar and products made with sugar will be accelerated.

18 CALORIES!

Surprise you that there are only 18 calories in a level teaspoonful of sugar? (Some people we asked guessed as high as 600.) Every 7½ minutes you'll probably use up as many calories as you get in a teaspoonful of sugar.



SUGAR means sucrose (beet or cane sugar).

Sugar Information, Inc.

New York 5, New York

Marine Vegetation Seen as Tomorrow's Food

Many scientists in the fields of agriculture nutrition, biology, and others, are freely predicting that vegetation from the seas will soon furnish a major contribution to the world's food supply.

The group of scientists responsible for the technical advances scored by the Algin Corporation of America are specialists in the field of marine vegetation. For years, they have studied, analyzed, and classified many forms of plant life found in the oceans of the world and have developed uses for them. More than that, they have developed processes for the extraction from these plants of a number of highly refined colloidal materials which have been outstandingly successful as important ingredients in food preparations.

It is our business to know a lot about seaweeds, their derivatives, and their uses. Our knowledge of the food uses of these materials is growing and we welcome any opportunity to share it with anyone interested -- or to enlarge it by fruitful cooperation with prospective users on the many intriguing possibilities these products offer.

Principal Products

EXTRACTS

Odorless and Tasteless

IRISH MOSS EXTRACTS

Water-Type Application

GELLING TYPES

Gelcarin GS-25
to
Gelcarin GS-350 (Super high gel)

NON-GELLING

Viscarin (Cold water soluble)

Milk-Type Application

GELLING TYPE

Gelcarin MR-20
to
Gelcarin MR-100 (Super high gel)

ALGINATES

Sodium Alginate (Non-gelling – Cold water soluble)

Extra Refined Grades – Calcium content less than 0.2%; odorless and tasteless; viscosity from 10 cps. to 1100 cps.

Regular Grades

Special Types

Potassium Alginate
Calcium Alginate
Ammonium Alginate
Alginic Acid

WHOLE GROUND PLANTS

IRISH MOSS

Ground Black Moss
Ground Bleached Moss
Ground Bleached and Deodorized Moss

ALGINATES

Kelp Meal
Kelp super fine

●

ALGIN CORPORATION OF AMERICA

MAIN OFFICE

24 State St., New York 4, N. Y. • Tel. WHitehall 4-1193

SALES OFFICES

CHICAGO 5: 600 South Michigan Ave. • Tel. WAbash 2-3829
LOS ANGELES 25: 2024 Westgate Ave. • Tel. BRadshaw 2-4346

Canadian Sales Representative—Charles Albert Smith Ltd.
356 Eastern Ave., Toronto 8 • 8307 Royden Road, Montreal 9

ALGIN CORPORATION OF AMERICA

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IN BREAD

Assures complete, controlled fermentation, enhances flavor and aroma, gives even texture, uniform grain, maximum retention of softness, longer shelf life.

IN CATSUP

Preserves piquant tomato flavor, enhances delicate spice flavors, protects the rich red color of all tomato products.

IN FROZEN DESSERTS

Assures firmer, finer-grained ice cream, with rich butterfat flavor—prevents surface crusting and preserves true fruit flavor in sherbets and water ices.

IN CANNED FRUITS

Enhances true fruit flavor, protects natural color, stabilizes the good eating qualities of fruits—adds appetite and sales appeal.

CERELOSE

BRAND DEXTROSE

For technical assistance in developing improved food processing formulations, contact our nearest sales office or write:

CORN PRODUCTS SALES COMPANY, 17 BATTERY PLACE, NEW YORK 4, NEW YORK

It's a measure of a man's ingenuity that he has developed an ingredient that can do wonders

for the looks, the taste, the keeping and lasting qualities of all kinds of food

products—**FRODEX** corn syrup solids. Take ice cream, for example: in all types,

FRODEX enhances flavor and texture, builds heat shock tolerance and total food solids

content and retards melt-down, among other things. Cakes baked with **FRODEX**

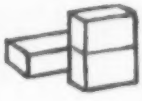
have a better quality because it produces a finer grain, smoother texture and better bloom; pie

crusts have better color, flake and taste. They bake faster and have longer shelf life. In

frozen fruit, **FRODEX** preserves color and natural fruit texture; it is an excellent moisture

conditioner in meat products, where it also reduces shrinkage and watering-off, is a superb

binding agent. In catsup it retains the natural color and retards oxidation in the neck of the

bottle. **FRODEX** offers distinct advantages in dry food mixes  because of its unique

characteristics. What more could the alert food products manufacturer ask for? (Except for additional

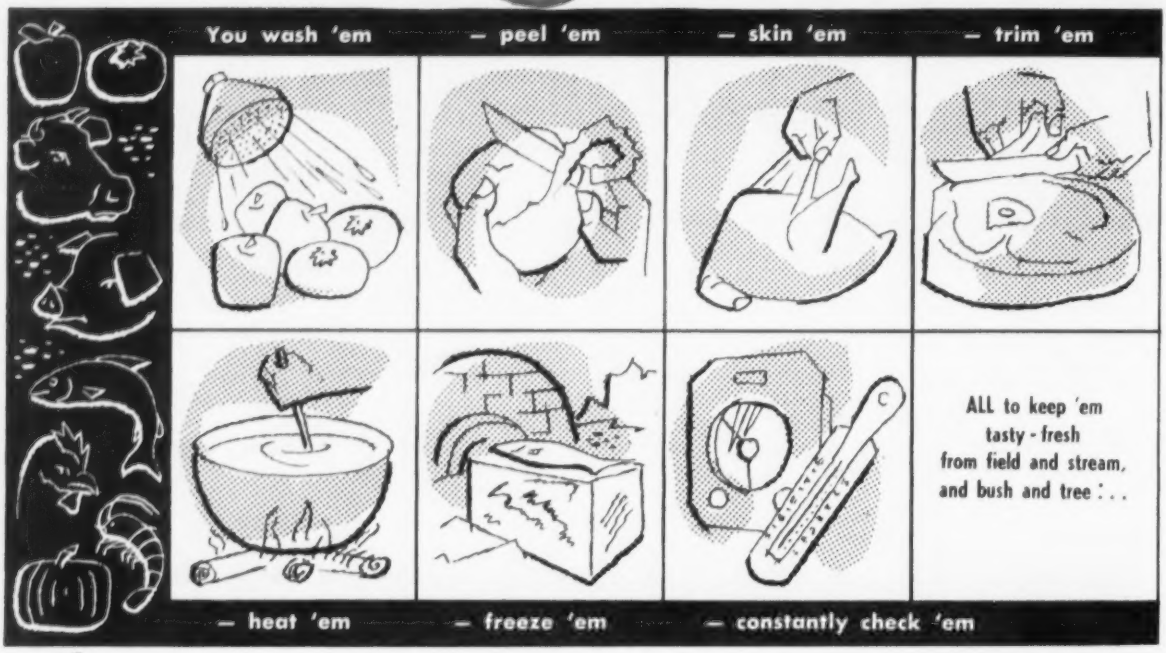
information and the assistance of our Technical Service.) **FRODEX** is available in both powdered and

granular form. **AMERICAN MAIZE-PRODUCTS COMPANY** • 250 PARK AVENUE,

NEW YORK 17, N. Y.

ATLANTA • BOSTON • BROOKLYN • BUFFALO • CHICAGO • DENVER • FORT WORTH • GRAND RAPIDS • LOS ANGELES
MEMPHIS • PHILADELPHIA • PITTSBURGH • PORTLAND • ST. LOUIS • ST. PAUL • SAN FRANCISCO • SEATTLE

In frozen foods, too — the High note of Quality is Griffith's!


You wash 'em
— peel 'em
— skin 'em
— trim 'em
ALL to keep 'em tasty - fresh from field and stream, and bush and tree : . .
— heat 'em
— freeze 'em
— constantly check 'em

But how well-controlled is the quality of ingredients you use?

TAKE GROUND SPICES AND SEASONINGS . . .

Griffith's are Purified! Prime quality — protected by patented Sterilization Processes to rid them, for all practical purposes, of micro-organisms that may cause off-flavor or costly spoilage. *TRUE FLAVOR CONTROL!*

TAKE MEAT TENDERIZERS . . .

Griffith's Tenderizers are formulated to improve the flavor while tenderizing tough, low cost beef. Are laboratory controlled for uniform potency and stability of the active principle. *QUALITY CONTROLLED!*

TAKE PEPPEROYAL (R) AND SOLUBLIZED SEASONINGS

PEPPEROYOL is just one of many spices processed from Griffith's own spice extractives. Controls assure Griffith's higher standard of flavor potency and purity—always uniform, always predictable in excellence of quality. Packed airtight in batch-size bags.

Your quality control can be made easier by Griffith.

THE GRIFFITH LABORATORIES, INC.

CHICAGO 9, 1415 West 37th Street

Griffith

NEWARK

LOS ANGELES

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uniformly fine flavor

Don't give normal seasonal or regional variations in flavor a second thought when you use MSG (pure mono sodium glutamate) in food processing and preparation.

MSG controls the over-all flavor features of quality protein foods. By blending and strengthening their naturally fresh taste MSG can create a uniform flavor identity the consumer recognizes. It is economical and easy to use.

Always rely on Great Western MSG to accentuate and maintain the fine fresh flavor characteristics of your product. Insure *uniform flavor-quality* to develop dependable customer brand preference.

Discover **"The Secret of Good Taste"** *— Try Great Western's*

GREAT WESTERN
MSG
99+% Pure Mono Sodium Glutamate Crystals

in: vegetables, meats, canned soups, poultry, seafood, sauces, gravies, seasonings, and frozen foods.

A Product of
AMERICAN AGRICULTURE

We invite inquiries from current and prospective users of MSG

THE GREAT WESTERN SUGAR COMPANY
Denver, Colorado

For more data, circle this page number on card at back →

Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt

Controlling Brine Strength Automatically—with "Hydraulic Balance"

Until recently, controlling the strength of dilute salt brine required delicate, costly equipment, as well as maintenance by experienced personnel. Today, however, you can accurately regulate the strength of dilute brine by means of a system which is simple, rugged and economical—and requires no maintenance. This is the system of "Lixate Hydraulic Balance."* Just a few minor additions to a Lixate Brine-Making Installation will put this control system into operation.

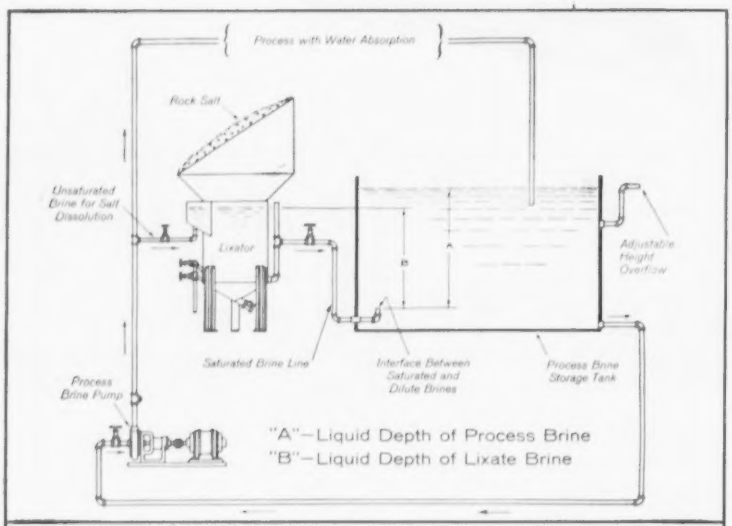
Only 2 basic pieces of equipment are necessary in most cases: a brine storage tank and a Sterling Lixator. In the tank, there is a column of process brine (less than 100° S.). In the Lixator, there is a column of fully saturated brine. The Lixator is joined to the tank at the bottom by a small connecting pipe. Whenever the process brine is weakened, it is immediately—*and automatically*—brought back to its original strength by the entrance of fortifying brine through the connecting pipe.

Principle of "Lixate Hydraulic Balance." The principle under which this system operates involves the hydraulic balance between the column of saturated fortifying brine and the column of process brine.

For example: you have a column of 70° S. process brine with a liquid depth of 10 ft. You have another column of 100%-saturated Lixate Brine 9.46 ft. in depth. These two columns are in hydraulic balance. In other words, even though they are connected by a small pipe near the bottom of the columns, there will be no flow from the Lixator brine supply into the process brine. The 70° S. brine will not change in strength. (The formula for determining the relative heights of the two brine columns is available from International.)

"Lixate Hydraulic Balance" at work. Suppose the process brine falls below 70° S. Even though the process column is still 10 ft. high, its specific gravity is lower. Hence, some of the 100%-saturated brine (of heavier specific gravity) will flow through the connecting pipe into the process brine.

The flow will continue until the process brine is restrengthened to its original 70° S., at which point the two columns will again be in hydraulic balance, and all flow from the stronger brine to the weaker will stop. Since this operation takes place *whenever* the process brine is weakened, the result is a process brine which varies so little from its original salometer reading as to be virtually constant in strength.



TYPICAL "LIXATE HYDRAULIC BALANCE" SYSTEM. Fully saturated Lixate Brine from Lixator (at left) maintains original strength of dilute brine in tank.

"Lixate Hydraulic Balance" is foolproof, because of the basic behavior of two brines in contact with each other. It is known that the rate of diffusion between a strong and a weak brine is surprisingly slow, even over a large contact area. However, to reduce this diffusion to a negligible amount, the interface (area of contact between the brines) is purposely kept small. In many cases, a perforated shield is placed around the diffusion zone to further protect the interface. With this shield, the Lixate Brine and the process brine can be thoroughly mixed by agitation without causing excessive diffusion at the interface.

Complete technical data available free. There are many designs of storage tanks (if not already in existence in the plant), connecting pipes, interface protecting shields, as well as complete tables for determining the relative heights of process and fortifying brines. To get this comprehensive data for your plant needs, simply get in touch with International.

TECHNICAL SERVICE WITH YOUR SALT

Through skilled and experienced "Salt Specialists," International can help you get greater efficiency and economy from the salt you use. International produces both Sterling Evaporated and Sterling Rock Salt in all types and sizes. And we also make automatic dissolvers in metal or plastic for both kinds of salt. So we can recommend the type and size of salt most perfectly suited to your needs.

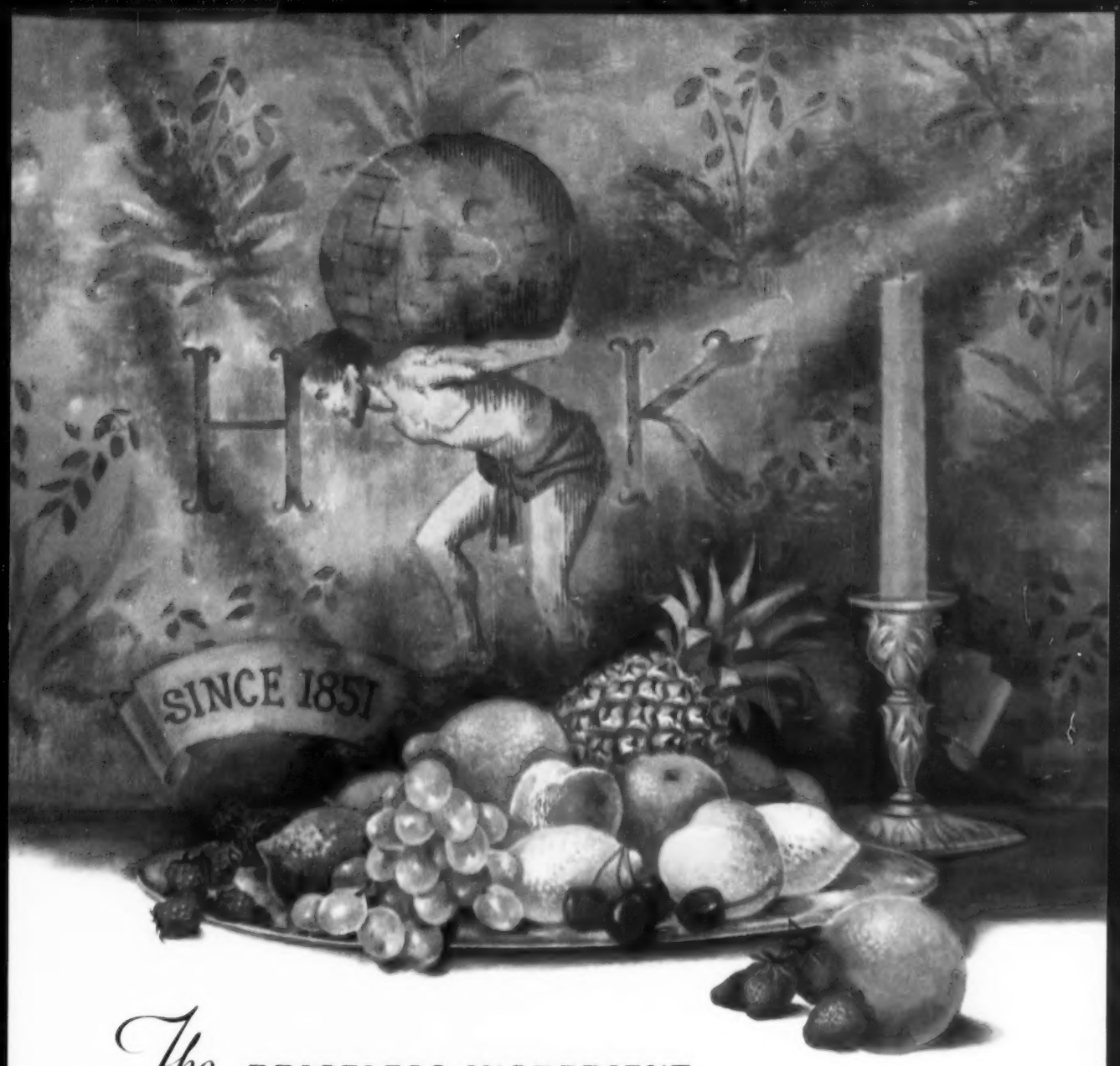
If you'd like the assistance of an International "Salt Specialist" on any problem concerning salt or brine—or further information on the system of "Lixate Hydraulic Balance"—just contact your nearest International sales office.

International Salt Co., Scranton, Pa.

Sales Offices: Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N. J.; Buffalo, N. Y.; New York, N. Y.; Cincinnati, O.; Cleveland, O.; Philadelphia, Pa.; Pittsburgh, Pa. and Richmond, Va.

*Trademark. U.S. Patent 2,508,170, and Patents Pending.

FOR INDUSTRY, FARM, AND THE HOME—
STERLING SALT
PRODUCT OF INTERNATIONAL SALT CO., INC.



The **PRICELESS INGREDIENT IN FRUIT FLAVORS.....** QUALITY

The Superiority of Atlas Fruit Flavors is recognized the world over today. Whatever your performance problem may be, Kohnstamm laboratories staffed by some of the world's leading flavor experts bring to bear a technical approach, based on fundamental research that has been proven over many years throughout the industry. Our specialized experience in flavoring problems, of whatever kind, is at your service and your inquiries are invited.

FIRST PRODUCERS OF CERTIFIED COLORS

H. KOHNSTAMM & COMPANY Inc.

ESTABLISHED 1851

89 PARK PLACE, NEW YORK 7 · 11-13 E. ILLINOIS ST., CHICAGO 11 · 2832 E. 54 ST., HUNTINGTON PK., CALIF.
BRANCHES IN OTHER PRINCIPAL CITIES OF THE U.S.A. AND THROUGHOUT THE WORLD

A PRIME OUTLET FOR GOOD PUBLIC RELATIONS

and a desperately-needed public service

One of the most effective public relations jobs ever accomplished was achieved last year by hundreds of companies and individual businesses of every size.

These companies have been helping to sustain an advertising campaign that performs a desperately-needed public service: It shows the American people how to drive to stay alive. It also portrays the almost unbelievable fact that more than 40,000 men, women and children were killed in traffic accidents last year—and tells what to do to help stop highway homicide.

The campaign was prepared by a volunteer advertising agency in cooperation with The Advertising Council and The National Safety Council. But the over ten million dollars worth of time and space which carry the messages to the public was contributed by media owners or sponsored by business organizations, in the public interest.

Your own plans may readily permit the inclusion of such advertising—both from the view of the vital public service it would perform, and the incalculable good will it would promote for your name, your company, and your product or service.

To find out how easily your own program can tie in with this nationwide effort, and for the complete story on who, what, when and where, we sincerely invite you to write to The National Safety Council, Chicago 11, Illinois.

Published in cooperation with
The National Safety Council
The Advertising Council

NOW 3 SUPERIOR CORN SYRUP SOLIDS

carry the OK BRAND of QUALITY

1. OK DRI-SWEET 42 D.E.—(Coarse)
2. OK DRI-SWEET 42 D.E.—(Powdered)
3. OK DRI-SWEET Low D.E.—(Powdered)

for Better Conditioned, Finer Flavored Foods

OK DRI-SWEET 42 D.E. (COARSE) is especially suitable for seasoning comminuted luncheon meats, smoked, cured and preserved meats. It is colorless, reduces watering off, cuts shrinkage, improves texture, is a better binding agent and can be used in greater quantity for maximum fill.

But, whether you produce prepared meat products, dry food mixes, frozen foods, ice creams, soup mixes . . . if you want finer flavor, better texture, controlled moisture, increased solids, and improved shelf life . . . *if you want quality at no extra cost* . . . you can get it with the OK BRAND DRI-SWEET Corn Syrup Solids. In fact, *only* OK DRI-SWEET Corn Syrup Solids provide a combination of *so many advantages in a single conditioner-seasoner.*

Write today for detailed data on how OK DRI-SWEET Corn Syrup Solids can help you improve your production, or phone for a Hubinger Food Products Technician. You'll find him and the Hubinger Customer Research Service OK too.

The Hubinger Company

KEOKUK, IOWA

HUBINGER 76 YEARS QUALITY PRODUCTS FROM CORN

NEW YORK • CHICAGO • LOS ANGELES • BOSTON • CHARLOTTE • PHILADELPHIA

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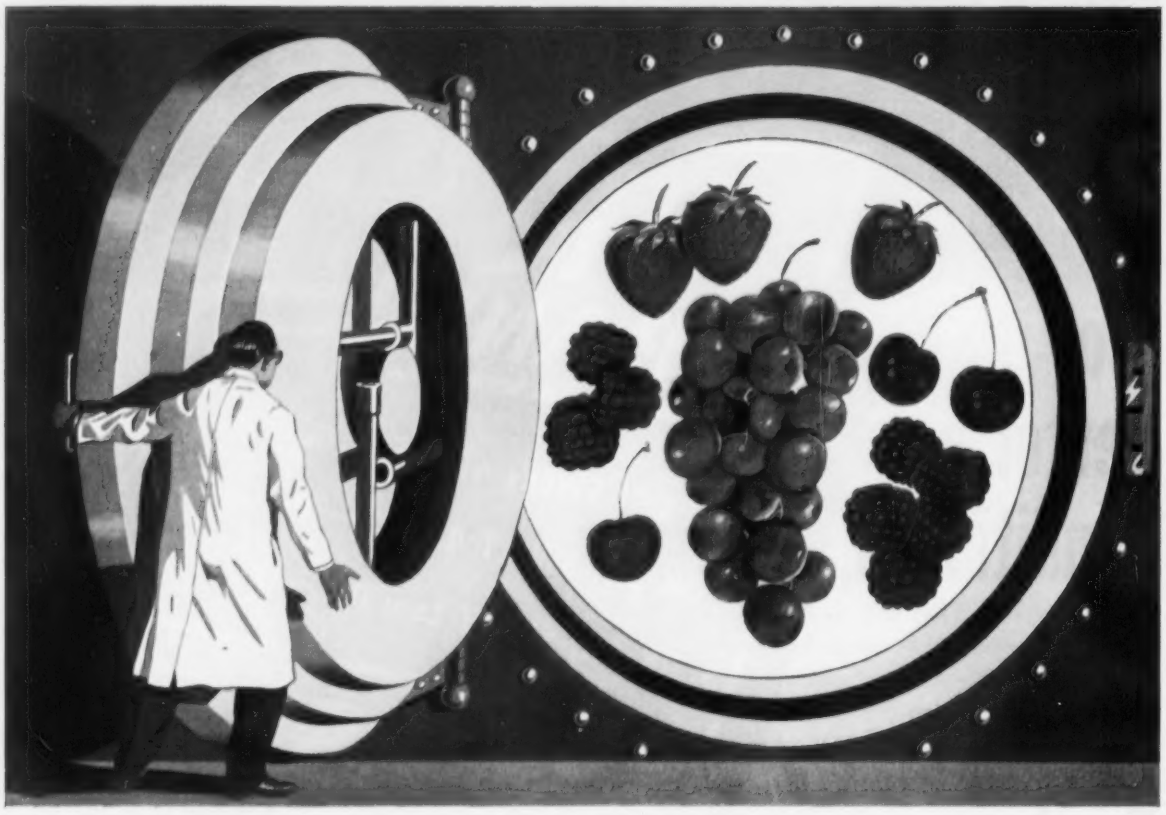
The flavor is LOCKED-IN!



For the *SAFETY* of your Products...use

FELCOFIX® | POWDERED FLAVORS

FELCOFIX® LOCKED-IN Flavors are dry homogeneous powders that remain FRESH, TRUE and DELICIOUS even when used in mixtures containing acids, sugars and other reactive ingredients.

FELCOFIX® LOCKED-IN Flavors have truly amazing lasting power and their high concentration results in economies that are important to your profits.

For the ultimate in flavor quality and flavor retention in your dry mixes, powders, powdered gelatin, tablets, wafers, etc., and to assure the sales success of your products...

INSIST ON FELCOFIX® LOCKED-IN Flavors!

Our technical staff is at your disposal. Write for liberal samples.

Felton Flavors

True Fruit Flavors · Imitation Flavors · Vanillas

FELTON CHEMICAL COMPANY, Inc.
599 Johnson Avenue, Brooklyn 37, N. Y.
Sales Offices and plants in major cities, Canada and overseas

®Registered Trademark

ONLY GOOD FLAVORS can make these products *tastier than they look.* Pickle processors know from long experience that dependable year in, year out uniformity and super-quality of FRITZSCHE'S SPICING OILS is the one thing that contributes most to the appetizing goodness of their finished products. Remember: *Your product is* ONLY *as good as its* FLAVOR!

For informative data on PICKLE spicing or any other specific food or beverage flavoring need, write our Flavor Division, Dept. FE.

FRITZSCHE *Established* 1871

Brothers, Inc.

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES *and* *STOCKS: *Atlanta, Georgia. Boston, Massachusetts. *Chicago, Illinois. Cincinnati, Ohio. *Los Angeles, California. Philadelphia, Pennsylvania. San Francisco, California. St. Louis, Missouri. Montreal and *Toronto, Canada and *Mexico, D. F. FACTORY: Clifton, N. J.

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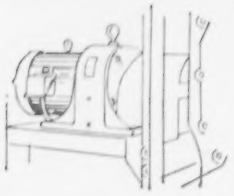
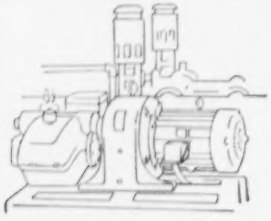
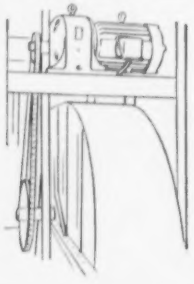
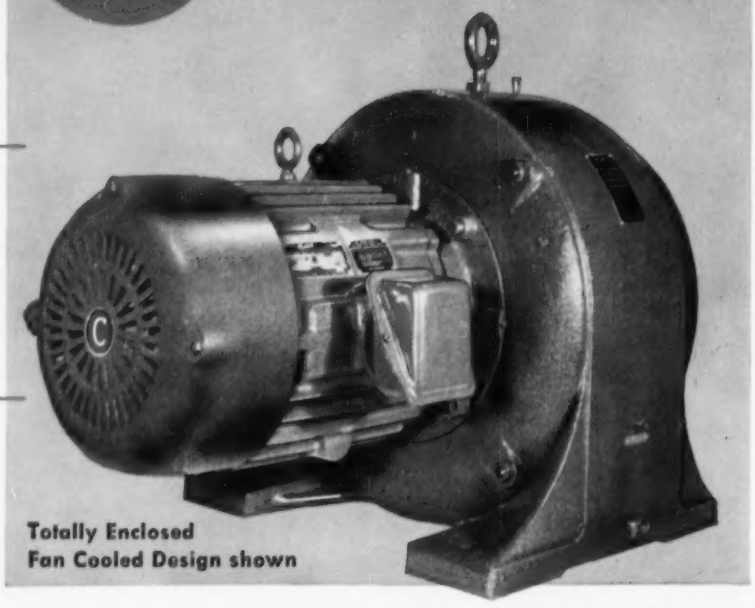
SLOW SPEEDS...TOP EFFICIENCY!

new completely redesigned Century-powered GEARMOTORS









Totally Enclosed
Fan Cooled Design shown

Single, double and triple reduction available with output speeds from 750 to 7.5 RPM. 1 to 125 HP.

the right combination of quality motor and quality gearing for trouble-free service:

1 to 75 HP

Ideal where quick motor interchangeability is necessary. Double and triple reduction units with output speeds from 350 RPM to 7.5 RPM.

- **Performance-Rated© polyphase, single phase and DC Motors**
- **Duti-Rated Lifetime High-Capacity Gearing**

Newest improvements in gearmotor design—assure you top efficiency in all your slow-speed power applications! Century Gearmotors combine famous Century motor quality and precision gearing to give you increased dependability, cooler operation, maximum wear life . . . trouble-free service even under your heaviest loads! Variety of mounting positions available including downshaft and tilted shaft.

Performance-Rated to your specific needs . . . available in open drip proof, dust proof, explosion proof and totally enclosed frames. Call or write your nearby Century District Sales Office or Authorized Distributor.

Performance-Rated© MOTORS
1/20 to 400 HP

CENTURY ELECTRIC COMPANY

07 **1806 Pine Street • St. Louis 3, Missouri • *Offices and Stock Points In Principal Cities***

KEEPING UP WITH THE FIELD

Can Maker Switches to Rolls

Coiled tinplate—weighing 15,000 lb.—is readied for shipment to American Can Co., Tampa, Fla., by a Jones & Laughlin Steel Corp. worker. The new roll technique, which replaces traditional cut sheets, is expected to improve can making efficiency.

New Pectin for Toppings

Slow moving stocks of frozen fruits may be converted quickly into more marketable products such as toppings and fruit spreads with the aid of a new low-sugar pectin, reports researchers at Oregon State College.

Most commercial toppings require a considerable amount of sugar and cooking time to "set" the mixture. But the new pectin will set fruits containing little or no added sugar.

Adopt Robot Fillet Grader

Three British fish plants have adopted a new Danish automatic fillet grader that can separate the fish slices into twelve grades at the rate of 6,000 pieces per hr., announces the U. S. Fish & Wildlife Service.

Fillets are fed into a revolving turntable that contains twelve parallelogram balances. Weights are automatically dropped on the balance pans and fish drop into separate containers when the appropriate weight is reached.

Nutrition Experts Disagree Sharply On Role of Foods in Heart Disease

Scientific debate on the cause of heart disease—and particularly the food products responsible for this killer—struck a new high recently through sharp disagreement by two leading nutritional authorities.

Dr. N. Jolliffe, director of the Bureau of Nutrition, City of New York, declares that a high percentage of coronary heart cases are victims of modern diet.

Use of butter, margarine, fried foods, and high fat desserts, such as ice cream, cake, and pastries should be restricted to infrequent occasions, he asserts, to avoid intake of the cholesterol found in fatty foods. And application of fat milk should be limited to coffee and cereal.

Dr. Jolliffe urged consumers to use high-value protein foods, such as fresh and canned fish, lean meat, poultry, and non-fat milk and cottage cheese. Calorie deficits can be made up with bread, potatoes, vegetables, and fruits, he concludes.

Dr. C. G. King, executive director of Nutrition Foundation, Inc., New York City, disagrees with this view. In a recent speech to the American Diatetic Assn., he declared that the cholesterol content of foods is of much less significance than the total caloric content of the diet—irrespective of the source.

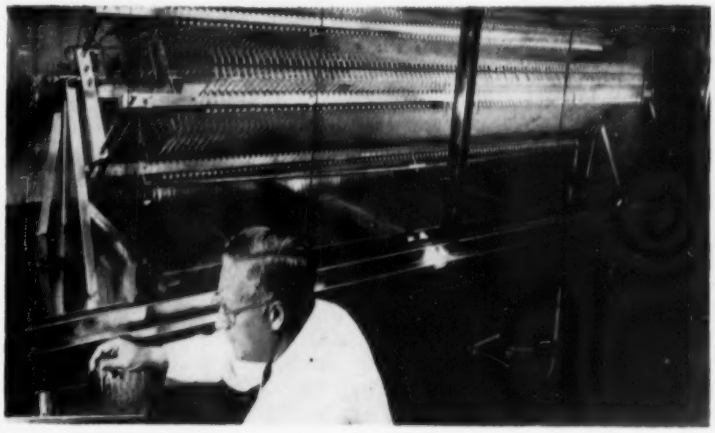
And he emphasized that in a well balanced diet—one without excessive calories—all of the common edible fats appear to be well utilized, on the basis of digestion and bodily combustion.

Dr. King concludes, therefore, that one cannot justifiably attribute the formation of excess cholesterol in the body to fat utilization alone.

More Ice Cream in Cartons

Rectangular paraffined cartons continued to gain strength in the packaging of frozen desserts during '56, according to H. H. Robbins, executive secretary, Paraffined Carton Research Council.

This type of carton was used to package 364,000,000 gal. (43%) of the ice cream, ice milk, sherbet, water ice, and Mellorine production —a 5.3% gain over '55.



Wins Prize for Fats and Oils Research

Application of a new extraction technique to the investigation of vegetable oils has won first prize of $1,000 and a plaque for Dr. H. J. Dutton, a USDA research chemist, in the 1956 Glycerine Research Awards, sponsored by the Glycerine Producers' Assn. Dr. Dutton's work—performed with this 200-tube Craig-Post countercurrent apparatus—is described as a major breakthrough in research on fats and oils.

Normally, in producing welded pipe, the weld is made at the top. But gravity plays a nasty trick. It tugs at the fluid metal in the weld zone, pulling it down toward the middle of the pipe. The result, particularly in the heavier gages, is a perceptible bulge where it hurts the most – right on the inside surface. If you try to get rid of the bulge – at fair cost – the metal is undercut – and corrosion and erosion start there.

why there's NO BEAD–NO UNDERCUT

But Trent put a stop to that – simply by going into partnership with gravity. With their exclusive Contour-Welding process, they weld at the bottom – and gravity works for them. For then, the bulge is in the opposite direction – blending in perfectly with the contour of the pipe itself.

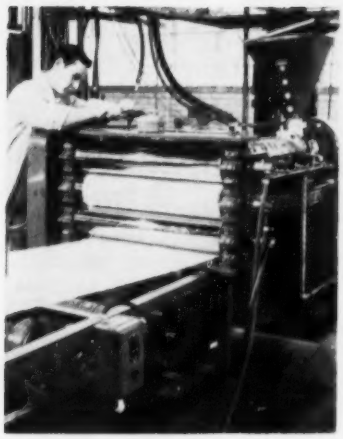
. . . *with new* CONTOUR TRENTWELD

New Contour-Trentweld stainless pipe and tubing is so smooth, both inside and out, that you can't even feel the weld. It's stronger, more uniform, with no place for corrosion or erosion to get a toe-hold. And it's available in any size or gage . . . in all stainless, high-alloy, Hastelloy and titanium grades that can be welded.

CONTOUR TRENTWELD

Stainless and High Alloy Welded Tubing

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of Crucible Steel Company of America)



To Probe Linear Polyethylene

Leaping into the scramble to be the first company with a sizable production of linear polyethylene, W. R. Grace & Co., Polychemicals Div., recently opened this new applications laboratory in Clifton, N. J. The facility—containing numerous chemical and physical laboratories for basic research, and a complete selection of molders and extruders (as above)—is designed to probe consumer uses for the high-density product (Grex), which will be produced in a new plant now under construction in Louisiana.

Meat Men Seek Court Aid, Distributors Plan Rebuttal

Battle plans are being drawn up by the meat packers and their antagonists, various wholesale and retail associations, for the impending showdown over the 1920 Trust Case consent decree in the Federal Court of the District of Columbia.

Packers are petitioning the court to ease the restriction, which prohibits them (in part) from using their branch-house distribution set-up for handling non-meat items, from owning retail food stores, and from having any interest in public cold storage warehouses.

The processors say that the decree prevents them from broadening their operating base, and thus handcuffs their ability to compete with rival processing and distributing firms that are not restricted in operations.

Wholesale grocery groups want the decree kept intact, and fear that the packers could exert tremendous economic pressure against distributors if they were allowed to wholesale dry groceries through their branch houses.

Similarly, retailers are afraid that meat men intend to buy up grocery chains and create a monopoly.

Another example of STANDARD-HERSEY leadership!

**a specially designed self-aligning joint flange was developed which permitted the dryer to be installed in an "inaccessible" location.*

It's more than Standard Steel's routine of good design, quality materials and skilled workmanship that sells *Standard-Hersey* dryers...often it's the unusual engineering *ability to solve a difficult problem.* Time and time again new and old customers alike come to Standard Steel.

For more than 50 years, Standard Steel has developed dryers for many segments of American industry... handling difficult drying jobs with trouble-free, efficient and economical service.

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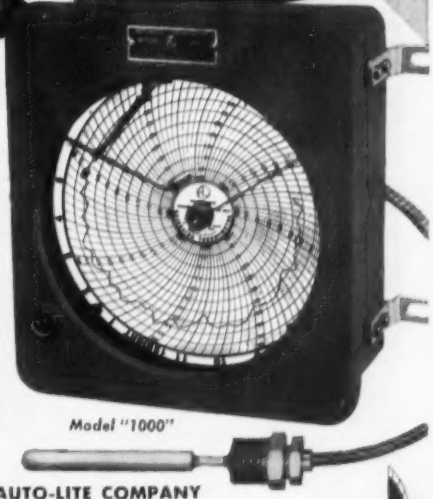

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For more data, circle this page number on card at back →

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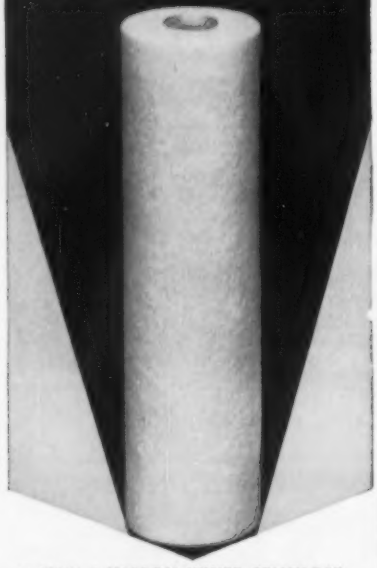

- **NEW 5-MICRON WHITE CELLULOSE CARTRIDGE . . .** is ideal for water, liquid food processing and all other applications where *Fine Filtration, Purity, Clarity* and complete absence from any filter-imparted *Taste* are essential.
- **LOWEST CARTRIDGE REPLACEMENT COST . . .** because Cuno's exclusive "Graded Density" feature uses the entire cartridge body for micronic filtration. Cartridge life is *doubled!*
- **A COMPLETE LINE OF STANDARD HOUSINGS . . .** for this new filter cartridge provides flow rates from a few gallons per hour to *hundreds* of gallons per minute!

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Humane Societies Pressure Packers To Adopt New Stunning Gun

Development of a new stunning gun has put meat packers under mounting pressure from humane societies to end the age-old practice of stunning beef cattle with a knocking hammer.

As a preliminary move, three of these humane groups have introduced bills in Congress demanding a change in method, and the American Humane Assn. has presented the manufacturer of the gun (Remington Arms Co., Inc.) with a plaque lauding it for "making a major contribution towards the long-cherished dream of humane slaughter".

Meat packers are afraid that Congress will be stampeded into enacting hasty legislation on the matter. And they have introduced a fourth bill calling for a packer's committee to investigate the new development.

It's not that the packers are opposed to progress. For, they've been working on the problem of humane slaughter for about thirty years. But other methods, developed in the past, have always proved unfeasible.

There are immediate problems with the new stunning gun, too. For one thing, it is expensive. And, being a single action weapon, it requires reloading after each shot. Also, the .22-calibre blanks that power the captive bolt cost 5¢ apiece.

On the plus side, however, the instrument delivers an accurate, powerful blow each time it is brought into contact with the head of an animal. And it does not pierce the hide or fracture the skull (thus minimizing "bloody brains").

"Price Spread" Defended By GMA's Paul Willis

"Without 'price spread' there would be no food business as we know it", declared Paul S. Willis, president, Grocery Mfrs. of America.

Speaking before the Bakers Club in New York City, he attacked "political crackpots, more interested in headlines than in understanding", and charged that they "speak of 'spread' as if it were a conspiracy to rob the farmer and consumer".

On the contrary, asserts President Willis, while spread has increased—from $370 in '46 to $590 in '56—combined net profit for manufacturers and distributors has decreased from a pre-war (1939) figure of 6¢ per consumer dollar to a present low of 3¢.

Thus, food men have actually helped to off-set the rising spread by accepting a lower profit margin in the face of increased wages, taxes, and other expenses, he concludes.

Predicts Jump in Candy

Confectionery production will increase from its present annual figure of 2.9-billion lb. to 4.2-billion lb. in 1975—a 45% jump—if the present per capita consumption is maintained at 17 lb., states Philip P. Gott, president, National Confectioners' Assn.

New Radiation Facility

With 88,000 sq. ft. of new plant space (left), High Voltage Engineering Corp. now ranks as one of the world's largest manufacturing and testing facilities for radiation equipment. Van de Graaff and linear particle accelerators can be operated simultaneously in 16 test vaults—as this one (right), where hamburger is being irradiated for the Quartermaster Corps. By means of a unique magnetic attachment to the wedge-shaped scanner, part of the electron beam passes through the meat, then reverses and irradiates the under side of the product.

Leaders in Aluminum... for the *FOOD* Industry

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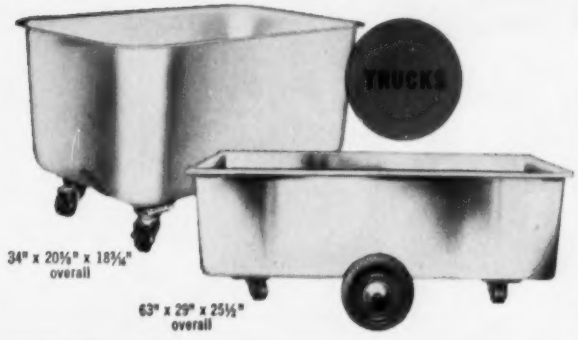

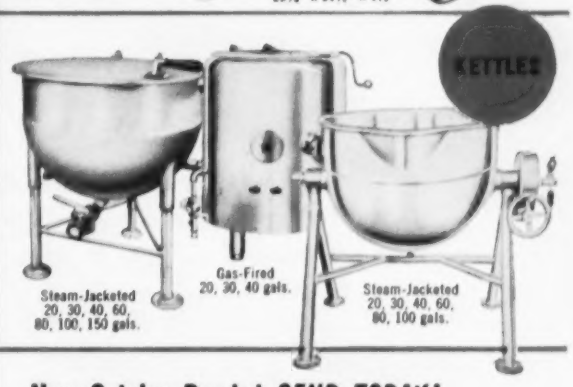

Want to speed production? Simplify your handling or storage problems? Standard, readily available items like these may be your answer.

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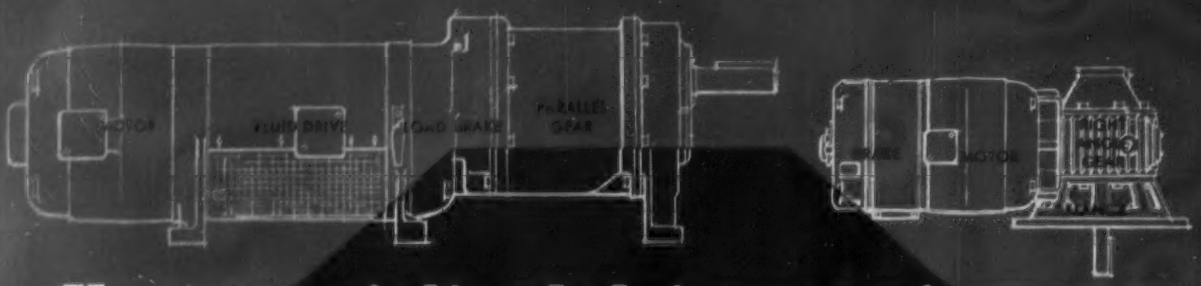
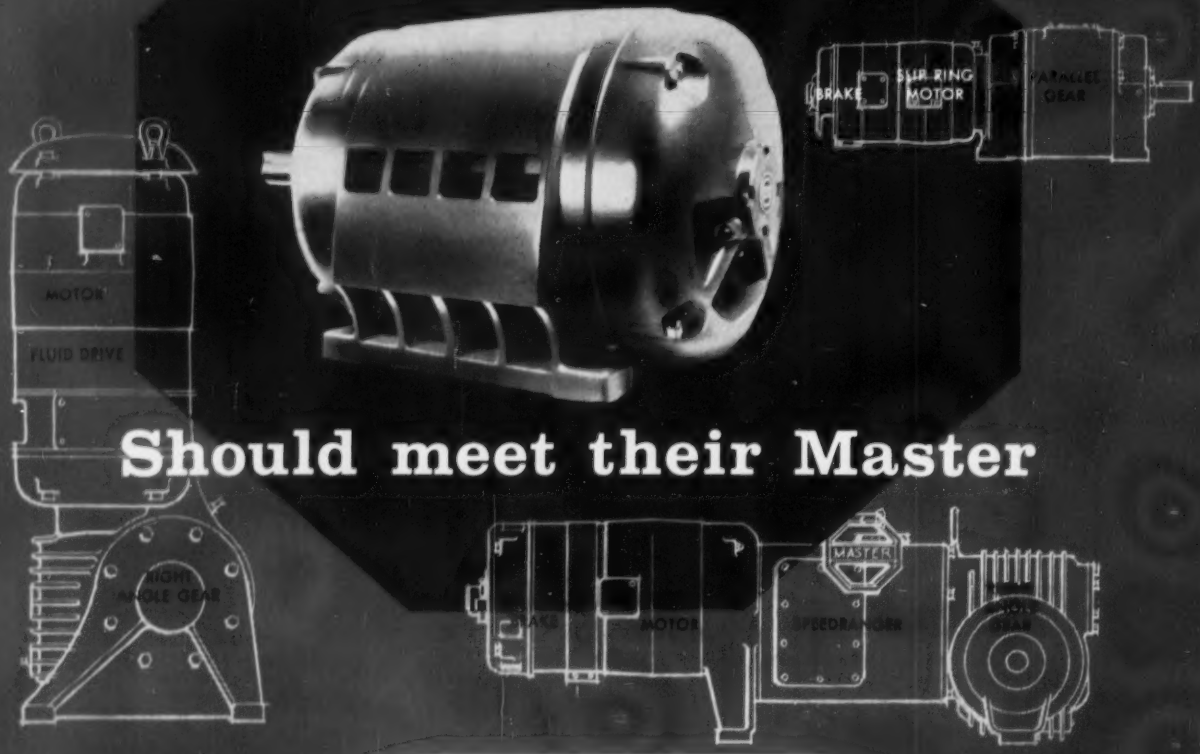


Your specialized drive requirements



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Master Units Combine into Engineered, Customized Package Drives—Providing the Right Shaft Speed, the Right Construction Features, the Right Mounting. Why Put Up With Makeshift Assemblies?

Engineers and Manufacturers of

Electric Motors	**⅛ to 400 H.P.**
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Alternating current motors, direct current motors, generators . . . open, enclosed, explosion proof . . . with 5 types of gear reducers . . . with electric brakes . . . with mechanical or electronic variable speed units . . . with fluid drives . . . Master has them all and so can be completely impartial in helping to select the one best drive for you.

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Troops to Eat Rayed Foods —But "Huge Test" Is Denied

The Army Quartermaster Corps has confirmed press reports that it was planning to feed irradiated foods to troops this year. But an Army spokesman told FE that the actual troops and amounts of foods to be used in the test project would be far smaller than the "tens of thousands" figure recently quoted at a scientific symposium.

Actually, says the Army, there are tentative plans to feed one irradiated item with each meal to a battalion-sized group—roughly 500 to 800 soldiers. The Army Surgeon General has been asked to okay a list of foods for this purpose as a safety measure.

Pilot Study for Sugar Beets

Research aimed at saving some of the $43,000,000 lost each year in handling and processing the Nation's sugar beet crop has entered the pilot plant stage at USDA's laboratory in Albany, Calif.

Dr. R. M. McCready, project

(Turn page)

Heads Up NCA Research

Dr. Ira I. Somers, who began his career with NCA in 1943, has now been appointed Director of Research for the National Canners Assn. Dr. Somers has been Associate Director of the Western Research Laboratory since 1955. Probably his greatest contribution to canning was his work in the development of in-plant chlorination, a technique that has immeasurably improved sanitation in this area of food processing.

PULP CONTROL

At the Turn of a Dial.

with the Sharples DV-2

EXTERNALLY CONTROLLED CENTRIFUGE REDUCES PULP CONTENT AS DESIRED AT CONTINUOUS FLOW RATES UP TO 3500 gph

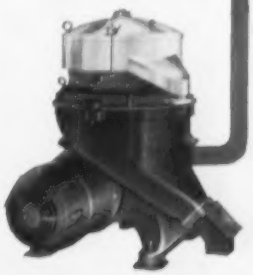
Critical final pulp content of fruit and vegetable juices can be maintained readily with the Sharples DV-2—with minimum loss of juice to solids.

Simply by setting a dial you control the frequency and duration of solids discharge valve openings. For example, if you want a 12% pulp content in the juice, the DV-2 can be set to remove continuously all excess pulp, as well as contaminants. A slight dial adjustment, and you can change to 11%, or 16%, etc.

The DV-2 is doing a big job throughout the world on citrus, pineapple, grape, apple, and other fruit and vegetable juices.* Why not take advantage of positive external pulp control at high capacities.

We'll be glad to discuss your problem; Bulletin 1243 will be sent upon request.

*The DV-2 can be adjusted to discharge a desired concentration for purees.



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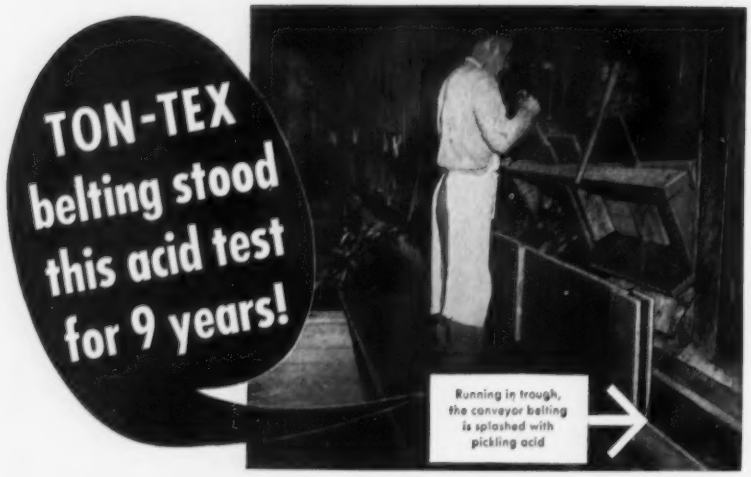

This pickle plant found there's a difference in acid-resisting conveyor belts. They tried many types to convey pickles to tanks, but acid soon ended their usefulness. Then they tried a Ton-Tex belt of tightly woven plies of cotton specially treated. *That belt stood the acid test for 9 years!* A similar Ton-Tex belt then replaced it. If you process or can foods, Ton-Tex belting can cut conveying costs. Let our engineers help select the *right* belt for your job.

● Conveying costs increased by moisture, heat, acids, oils? Ton-Tex belts will solve your problem . . . save money!

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- Users report costs reduced up to $500.00 per month per machine

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BUFFALO 13, NEW YORK

leader, states that the new facility will enable scientists to study current processing methods and try out improvements. Comprehensive tests will be conducted on different varieties of beets.

BRIEFLY

• **GRAPES** are now the subject of a special study at the U. of California, Davis, in an attempt to improve canning qualities of the fruit. The matter is considered vital in view of the importance of grapes as an ingredient of fruit cocktail.

• **DRY MILK SOLIDS** in glass jars is seen as a substantial and growing item by the Glass Container Mfrs. Inst., Inc. Convenience of resealing the package is the main sales point.

• **CONTINUOUS DOUGH** processes, developed for bread by Baker Process Co. and for angel food cake by American Machine & Foundry Co., are now available to all bakers, declare the respective companies. Baker Process Co. is now controlled by Wallace & Tiernan Inc., Belleville, N. J.

Correction

In the byline of the article, "Tap Workers' Mechanical Knacks to Develop Specialty Machines" (FE Mar., p. 88), the initial author's name appeared in incomplete form. It should have read, "C. S. Budge Mead."

Action on Standards

Following actions have been taken by the Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U. S. Standards and allowable tolerances of various pesticides on raw agricultural commodities. References are to *Federal Register*.

Pineapple, canned, AMS establishment of U. S. Standards, *F.R.*, Feb. 13, p. 875.

Pineapple juice, canned, AMS establishment of U. S. Standards, *F.R.*, Feb. 13, p. 883.

Asparagus, canned, AMS notice of corrected U. S. standards, *F.R.*, Feb. 15, p. 946.

Tomatoes, Italian type for canning, AMS notice of proposed U. S. Standards, *F.R.*, Feb. 19, p. 1004.

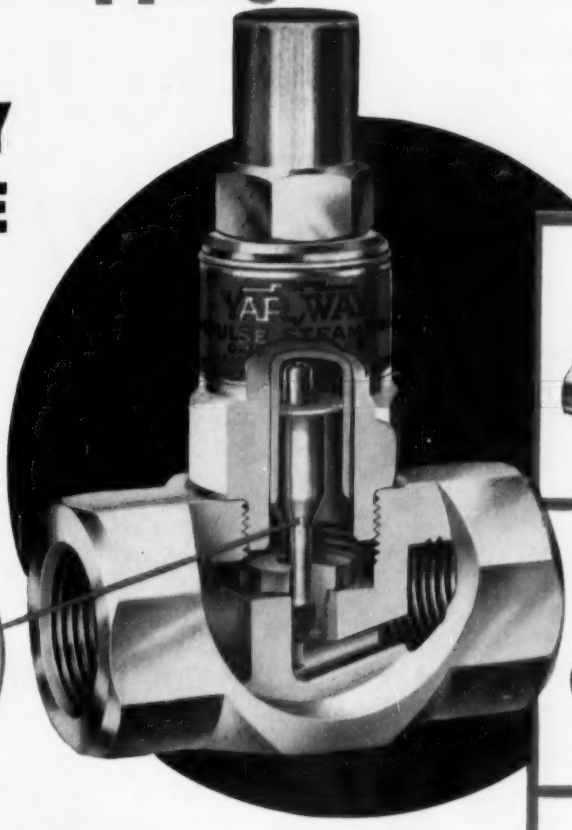
Tuna fish, canned, FDA standards of Identity, *F.R.*, Feb. 13, p. 892, correction, Feb. 16, p. 979.

Creamed cheese, partially creamed, FDA Standards of Identity, *F.R.*, Feb. 26, p. 1102.

Tuna fish, canned for canned

the impulse that revolutionized steam trapping

YARWAY IMPULSE STEAM TRAP



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...a small stainless steel valve that literally floats on the condensate load. Gets equipment *hot in a hurry*—and *keeps it hot!*

SERIES 60 and 120

For all *normal* trap requirements, pressures to 400 and 600 psi.

½" No. 20-A

For *light loads* on tracer lines, steam mains, small presses, etc.

SERIES 40

For *heavy loads* requiring extra high capacity steam traps.

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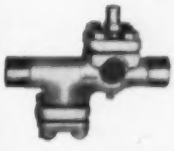

For *high pressures, high temperatures.* (Flanged or welding connections.)

Twenty years ago YARWAY applied a unique theory of thermodynamics to steam traps—and gave industry the amazing YARWAY Impulse Steam Trap.

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- **GOOD FOR ALL PRESSURES WITHOUT CHANGE OF VALVE OR SEAT**
- **SMALL SIZE—LIGHT WEIGHT**
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Above are two examples of the kind of attractive decorated containers coming out of US Steel plants today. Containers like these help advertise and sell the products they carry. Why not get this US Steel service for your business? Simply tell your USS representative the colors and type designs you want.

Profit from all 5 of these US Steel extras, too:

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USS STEEL DRUMS

UNITED STATES STEEL

tuna fish, FDA Standards of Identity, *F.R.*, Mar. 7, p. 1429.

On spices, tolerances of ethylene oxide, *F.R.*, Feb. 14, p. 931.

On fat of cattle, hogs, and sheep, tolerances of DDT, *F.R.*, Feb. 19, p. 1001.

On green beans, broccoli, cabbage, celery, cucumbers, eggplant, lettuce, melons, peppers, Irish potatoes, summer squash, sweet corn, and tomatoes, tolerances of ethylene dibromide, *F.R.*, Mar. 7, p. 1450.

Schedule of Events

April

14-27—U. S. World Trade Fair; Coliseum, New York City.

16-17—American Dry Milk Institute, annual meeting; Edgewater Beach Hotel, Chicago.

18-19—National Pickle Packers Assn. annual meeting; Drake Hotel, Chicago.

22-26—American Industrial Hygiene Assn., annual conference; Kiel Auditorium, St. Louis.

23-25—Conference on Interstate Milk Shipments; Hotel Peabody, Memphis, Tenn.

23-25—Research & Development Associates of Food & Container Institute, annual meeting; Jefferson Hotel, Richmond, Va.

25-26—Pennsylvania Mfg. Confectioners' Assn., annual production conference; Franklin & Marshall College, Lancaster, Pa.

27-30—National Fisheries Institute, annual meeting; Edgewater Beach Hotel, Chicago.

28-30—National Peanut Council, annual meeting; Hotel Fontainebleau, Miami Beach, Fla.

29-M3—Assn. of Operative Millers, annual technical conference & trade show; Statler Hotel, Buffalo, N. Y.

29-M1—American Oil Chemists' Society, annual meeting; Roosevelt Hotel, New Orleans.

29-M3—American Material Handling Society, conference & exposition; Convention Hall, Philadelphia.

May

4-12—International Pastry & Confectionery Trade Fair, Dusseldorf, Germany.

4- 8—Western Air Conditioning Industries Assn., conference & exhibit on air conditioning, heating, ventilating, and refrigeration; Shrine Exposition Hall, Los Angeles.

4- 9—American Society of Brewing Chemists, annual convention; Hotel Barbizon Plaza, New York City.

11-14—National Independent Meat Packers Assn., annual meeting; Palmer House, Chicago.

12-16—Institute of Food Technologists, annual meeting; Penn-Sheraton Hotel, Pittsburgh.

13-15—Industrial Waste Conference; Purdue Memorial Union Bldg., Lafayette, Ind.

13-15—Biscuit & Cracker Mfrs. Assn., annual meeting; The Plaza, New York City.

14-16—Armour Research Foundation, industrial nuclear technology conference; Museum of Science & Industry, Chicago.

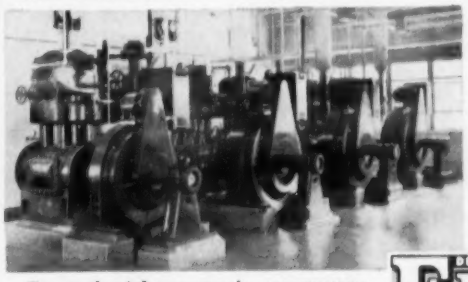
FRICK

Refrigeration Serves Big Armour Laboratories

Armour and Co. use "cold" in many ways in their great Pharmaceutical Laboratories, recently opened near Kankakee, Ill. These uses include air conditioning, biological process work, cold storage, heat-pump service, and research.

Temperatures can be held anywhere between −45 and +45 degrees F., but usually go no lower than −10.

Here a 2-stage Frick system of 1422 tons refrigerating capacity operates with efficiency and economy. Installation by Midwest Engineering and Equipment Co., Frick Sales-Representatives in Chicago.



Four of eight ammonia compressors furnishing refrigeration at temperatures down to −45° F.

For that important refrigerating, air conditioning, ice making or quick freezing job of yours, look to dependable Frick equipment. Sales-engineering and service, the world over. Let us submit estimates now: write, wire or phone

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Do you make one of these products?

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The modern efficiency way to process viscous liquid, slurry or paste food products. Triple-action TRI-HOMO mills homogenize, emulsify and effect particle size reduction all in a single controlled operation. Designed for consistently positive duplication of any formula. Matched rotor-stator combination to suit your particular product. Contamination-proof . . . leakproof . . . jam-proof. Easy to clean. *Write for catalog.*

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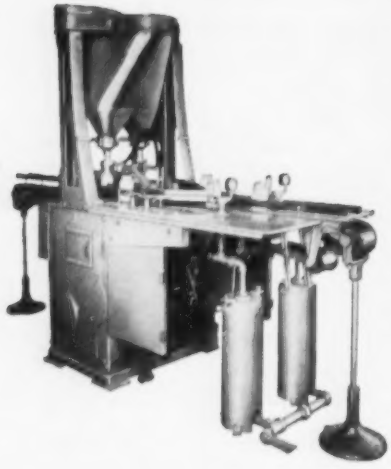
4 ways to protect your profits in packaging

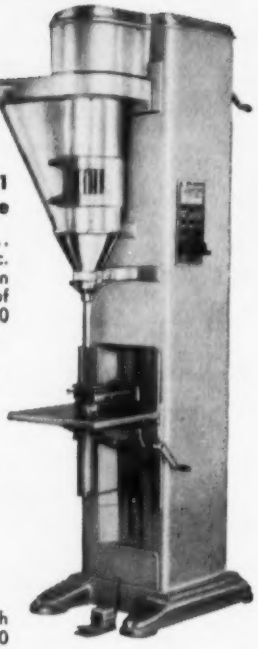
with accurate dust-free filling



1

Stokes & Smith Model EG-1
Universal Auger Filling Machine

Semi-automatic operation with any of four filling methods... volumetric, pressure packing, gross weighing, or Auger-Vac. 40% fewer working parts are all located above filling station for clean operation. Will accommodate a wide range of package sizes from 2 grams to 10 lbs. at speeds up to 30 units per minute.



Ideal for Dry Milk Solids

2

Stokes & Smith Auger-Vac assures clean, accurate fill with minimum dusting loss of whole or non-fat dry milk solids, hot chocolate powder, cocoa, instant coffee, etc. in cans or jars.

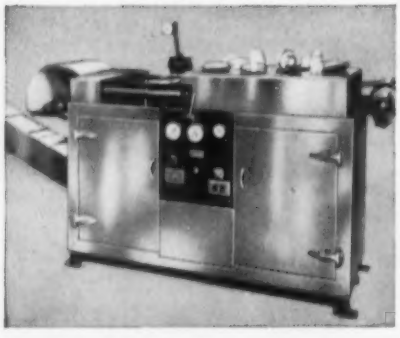
Stokes & Smith Model HG-84
Automatic Duplex Filling Machine

Two filling stations operate automatically by auger feed with precision cam-control for accurate filling. Speeds up to 60 units per minute. Also supplied with Auger-Vac equipment for fast, dustless filling of non-fat dry milk solids and other hard-to-pack powdered products.

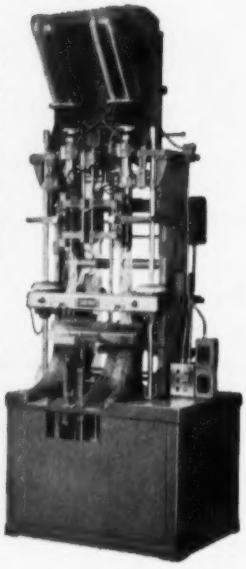
with fast, flexible packaging

3

Stokes & Smith Model "BS"
STOKESWRAP Machine



From roll stock, automatically forms, accurately fills a wide range of powdered or granular products and heat-seals either pillow-type or four-seal package. Handles a wide variety of packaging films at speeds up to 120 units per minute. Ask about STOKESWRAP for non-fat dry milk solids, dry cream, etc.



with contour wrapping

4

Stokes & Smith STRETCHRAP Wrapping Machine

Cheeses, meats and other odd-shaped products are wrapped at speeds of 12 or 15 units a minute in clear, sanitary, air-tight Pliofilm.* Reduces spoiling, handling damage, moisture loss. Tight wrinkle-free "skin" makes sales-appealing package.

*T.M. The Goodyear Tire and Rubber Co., Akron, Ohio

STOKES & SMITH CO.

4914-A SUMMERDALE AVENUE, PHILADELPHIA 24, PA.

Pacific Coast: SIMPLEX PACKAGING MACHINERY, INC., 534–23rd AVE., OAKLAND 6, CALIF.

fmc

SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

A Progress Report on Faculty Salaries:

UP . . . But Not Nearly Enough

THE CHART on this page provides a report of the progress being made in solving a problem of crucial importance to every American. The problem is that of seeing that college and university faculty members get decent salaries.

This new chapter, which brings the story forward two years—from 1954, when it was last dealt with in this series of editorials, through 1956—has a decidedly cheering element. For in the last two years faculty salaries have made real headway.

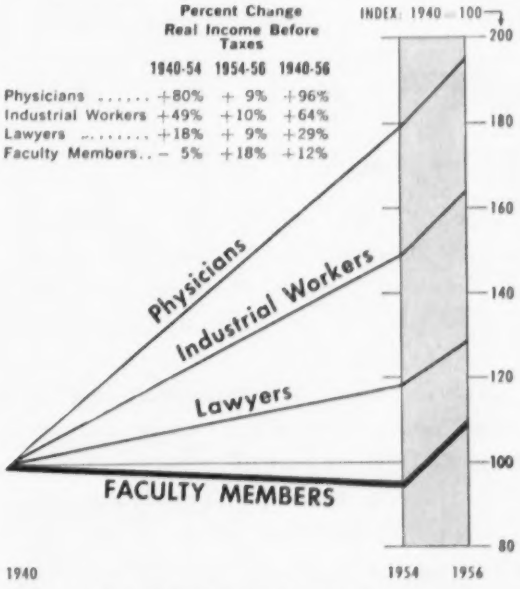
Two Years of Improvement

In 1954, in terms of what their salaries would buy, faculty members as a whole were actually worse off, by 5%, than they had been fourteen years earlier. As the chart shows, over the same period the real income of the average industrial worker had increased by almost half. And, in what it would buy, the income of the average physician, with professional training comparable to that of the average faculty member, had jumped by 80%.

In 1956, however, the average faculty salary would buy about 12% more of goods and services than it would in 1940. Relative to where they were two years before, faculty salaries showed a larger gain over the two years than those of any of the other groups whose salary progress is charted.

This movement of faculty salaries in the right direction has many contributing causes. The biggest single boost was given by the great Ford Foundation gift of half a billion dollars to our colleges, universities, and hospitals, almost half of which was ear-marked for faculty salary increases. Gifts from business firms have also

What is Happening to College Faculty Salaries



DATA: Council for Financial Aid to Education, U. S. Dept. of Commerce, U. S. Dept. of Labor, National Association of Education Research Dept., McGraw-Hill Dept. of Economics.

helped a lot. And so, in many cases, have stepped-up money-raising campaigns by alumni groups and cooperative regional and state groups of colleges.

Still a Long Way to Go

However, faculty salaries started their ascent from such a dismal depth that they still have a long, long way to go up before there is room for the comfortable conviction that they are fair, or even safe, from the standpoint of protecting the nation's vital interests. It still remains possible to find many shocking companion pieces for the following incident recently reported to a McGraw-Hill executive group, working on problems of financial aid to higher education, by the president of an illustrious small liberal arts college.

"The recruiting officer of one of our large industrial companies came to our campus a few weeks ago," the college president said, "and offered five of our seniors higher salaries to start working for that company when they are graduated next June than the salary received by any member of our faculty. And the seniors, of course, promptly went to their professors to seek advice on whether or not they should accept. It doesn't take much imagination to see what this sort of thing does to the morale of a faculty."

Senior Teachers Fare Badly

One of the more devastating things it does, of course, is to make the more experienced college and university faculty members receptive to the idea of going to greener pastures, currency-wise, in business and industry.

For these senior faculty members the financial pounding in the past 16 years has been even worse than the chart indicates. While the average real salary gain reported by the chart has been 12%, the average salary of a full professor still buys less than it did in 1940. This is because most of the salary increases have gone to beginning instructors, for whose services industry has been providing the sort of competition reported by the liberal arts college president.

And it creates this financial lackluster of posts as senior college faculty members right at the time their services are needed more than ever to handle the oncoming flood of college and university students. Between now and 1970 college and university enrollment is expected to double.

What is Needed Now

What is clearly needed is a continuation and intensification of the drive to increase their salaries to a point where college and university faculty members will be sharing somewhere near fully in the general prosperity of the nation. It could be counted good progress in this direction if over the next two years faculty salaries on the average were to go up another 12%, with most of the increase concentrated in the senior faculty ranks. And this can be made possible only through more outside contributions.

There is reason to be encouraged by the progress that has been made over the past two years in bailing college and university faculty members out of the terrible financial hole into which they were allowed to slide. But there is the most urgent occasion to keep at it and harder.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C. McGraw

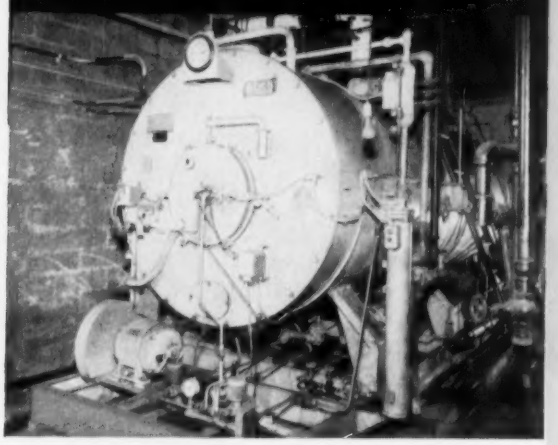
PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

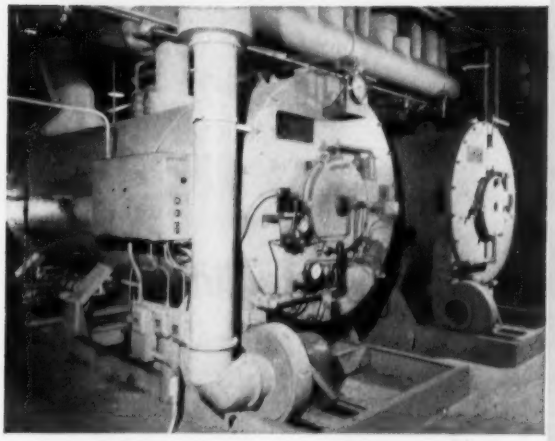
STEAM GENERATING PROBLEMS SOLVED

• • • a report

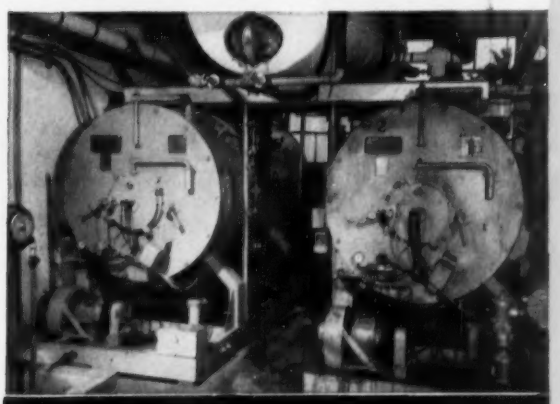
by AMESTEAM GENERATOR



Dependable steam supply for a food processing plant by a compact, automatic Amesteam Generator.



Supplying dependable heat for a large Junior-Senior High School — two efficient Amesteam Generators.



Variable steam requirements for a laundry ably met by these space-saving, easy-to-operate 60-HP Amesteam Generators.

LABOR SAVING ALONE PAID THE COST of the AMESTEAM GENERATOR installation in the plant of Victor Preserving Company. Writes Vice-President Donald E. Tobin:

"We have all the steam we need, when we need it, and, of course, the operation of the boiler is very much cleaner and simpler than our former boiler . . .

The saving in labor alone has more than justified the installation of the AMESTEAM GENERATOR to say nothing of the convenience and day after day dependability. The next time we need another new boiler, you can be sure it will be an AMESTEAM GENERATOR."

"CLEANER, VERY DEPENDABLE AND ECONOMICAL" writes Supervising Principal Charles Knapp about two AMESTEAM GENERATORS installed at Griffith Institute and Central School in 1955.

"We find them much cleaner, of course," reports Principal Knapp, "and we are also well pleased with their very dependable and economical performance. As you know, we still have coal fired boilers in the older buildings, so we have a chance to make a direct comparison."

"SIMPLE TO OPERATE . . . MINIMUM SERVICE . . . HIGHLY EFFICIENT", is the way Mark Denburg of Mark's Quality Cleaners & Launderers, Inc., describes his A-60 AMESTEAM GENERATORS.

"We can highly recommend AMESTEAM GENERATORS", writes Mr. Denburg, "to anyone considering the purchase of a steam generator. Our experience has been that they are simple to operate and require a minimum of service. They are highly efficient from a fuel standpoint and we are well pleased with them. You may feel at liberty to bring a prospective customer to see these units any time."

WHAT'S YOUR STEAM PROBLEM? If you need 10 to 600 HP and want the kind of space-saving, trouble-free service enjoyed by these owners of AMESTEAM GENERATORS, write today for our catalog and the name of your nearby AMESTEAM dealer.

AMES IRON WORKS INC.

BOX B-47 OSWEGO, N.Y.

For more data, circle this page number on card at back →

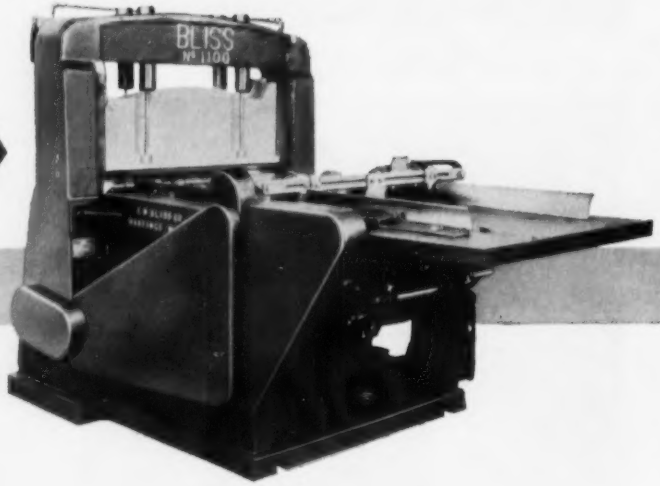
for can bodies...

BLISS BODYMAKER NO. 403—forms 400-500 #202 to #404 sanitary bodies per minute. Easily set up and adjusted.

Six newly-designed key machines for high-speed can lines

Their 400-500 per minute speeds, their adaptability to various sizes, gives you greater production at less cost

SCROLL SHEAR NO. 1100—blanks scroll cut strip from 36x36" sheet at 125 spm.



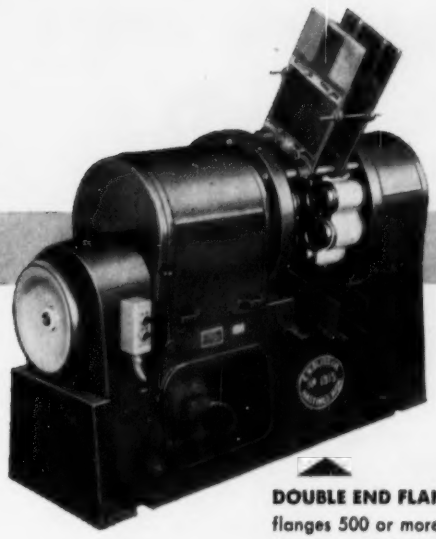
for can ends and closures...

BLISS
SINCE 1857

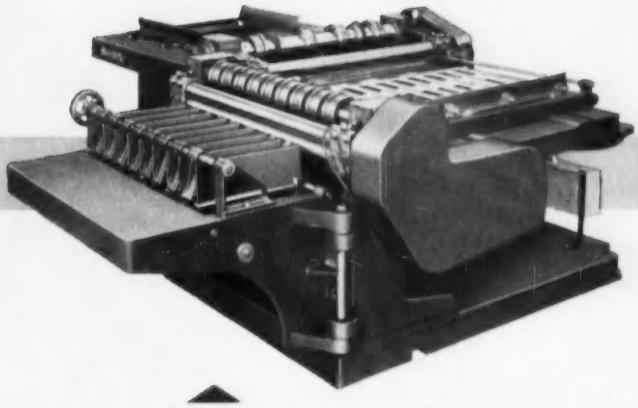
A Century of Making Metals Work for Mankind

E. W. BLISS COMPANY, Canton, Ohio

PRESSES • ROLLING MILLS • MILL ROLLS • DIE SETS • CAN MAKING MACHINERY



DOUBLE END FLANGER NO. 1315—flanges 500 or more per minute: diameters from 2 to 4-3/16"; heights, 2 to 8".



DUPLEX TRIMMER AND SLITTER NO. 5225—trims and slits, or slits bodyblanks from 36x36" sheets. Speed: 30-75 per minute.

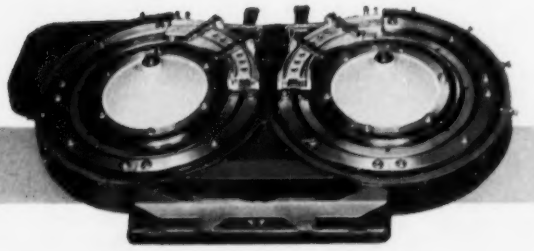
Every day more Bliss can machinery appears in leading can making plants. Reports show that they prove themselves in many ways.

They produce more cans with far less downtime. They are easily set up, readily adapted to changing requirements. And they are dependable, running shift-after-shift, day-after-day with little need of maintenance.

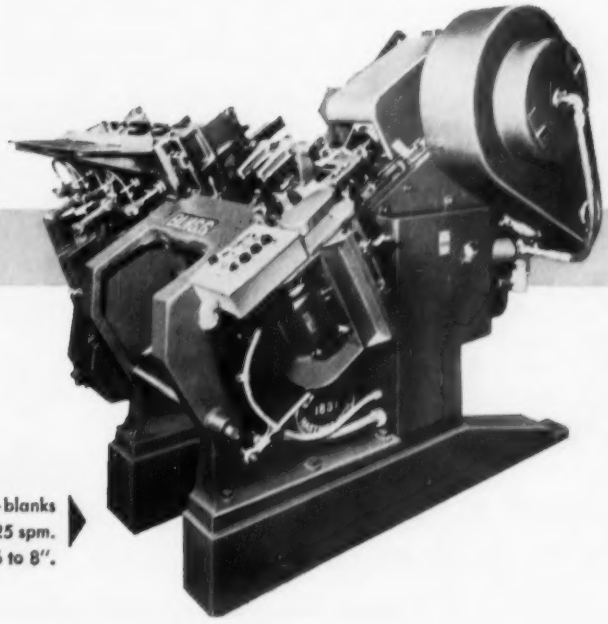
It makes sense then to call Bliss—whether you need one machine or whole new line. Why not give your nearest Bliss Field Engineer a call, or write to E. W. Bliss Company, Canton, Ohio.

Complete catalog available on any machine shown here.

1. Slitters, scroll shear
2. Strip feed presses, curlers, stackers
3. Bodymakers, power formers, horn and seaming presses
4. Flangers, beaders, thread rollers
5. Double seamers, side seamer
6. Testers

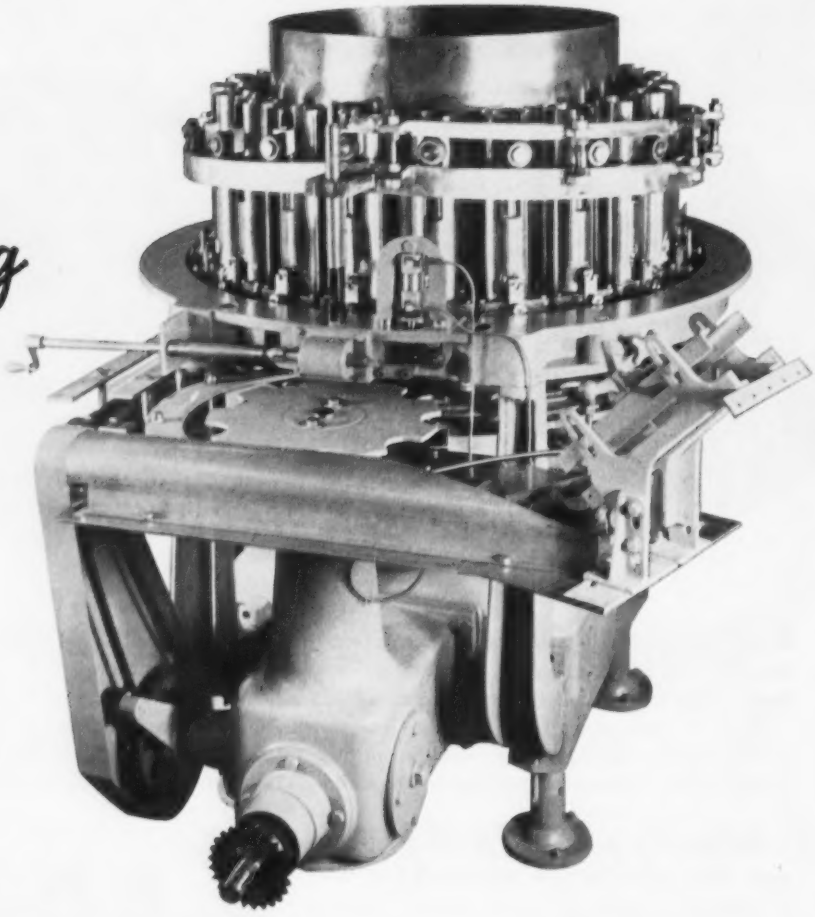


DOUBLE CURLER NO. 20—Curls ends from 2 to 4¼" in diameter. Stackers, conveyor belt intakes available.



STRIP FEED PRESS NO. 1831—blanks and forms can ends and closures at 325 spm. Diameters: from 1-15/16 to 8".

Announcing a NEW Pfaudler filler



Improved 21-station filling machine offers easier adjustment, greater accuracy than ever before

You can now package your viscous or semi-solid products with new speed and economy.

The new Model RPC-21 gives you smoother, uninterrupted production through 10 advanced design changes. They mean more accurate filling at higher speeds, easier filler control and reduced maintenance. All changes have been production-line-tested on millions of cans in one of the nation's largest canning plants.

So before you buy your next filler, consider these 10 important advantages:

1. Smoother container handling with plastic infeed screw.
2. Feather - touch, non - abrasive, electro-pneumatic "no container-no fill" control.
3. New positive - positioning filler valve control, easily adjustable.
4. New adjustable, double-open-track container path through filler. Container tilt can be controlled to compensate for centrifugal force, preventing product throwout.
5. New accuracy-of-fill control mechanism, conveniently located for safe, easy, and quick adjustment.
6. Complete adjustment of fill through full range of cylinder without additional parts.
7. Precise synchronized transfer of filled container to auxiliary or to closing equipment.
8. Splined shafts throughout—no keys or pins to fail.
9. Access to all gears and shafts through base of filler.
10. New simplified changeover for different container sizes.

All Pfaudler fillers offer you many primary benefits—such as faster filling, low operating cost, easy cleaning, and accurate filling. For detailed information, contact your Pfaudler representative. Or, write to us direct.

THE PFAUDLER CO. **ROCHESTER 3, N. Y.**

MEN & COMPANIES—

Dr. Carl R. Fellers
—Coach and Counselor Of Technologists

This July will see Veteran Technologist Dr. Carl R. Fellers finally "closing his desk" at the University of Massachusetts, Amherst.

Behind him stretch more than 30 years of outstanding service with the U. of M., the last 16 as the head of the food technology department.

Word of Dr. Fellers' retirement directs attention to his many contributions, which include publication of more than 200 technical papers.

In 1949 he was president of IFT, and he was chairman of the Agricultural & Food Division of the American Chemical Society in the same year. Further, he is a recipient of the Babcock Award of the American Institute of Nutrition.

During World War II, he was in charge of food procurement for our Army in Australia. He later held Army Reserve rank of lieutenant colonel in the QMC, and also served as commanding officer of the 1224th Research & Development Unit.

He is a graduate of Cornell and holds M.S. and Ph.D. degrees from Rutgers. After initially teaching at the U. of Washington, he went on to do bacteriological work for the government, and he also handled special technology tasks for National Canner Assn.

Personnel

Ralph Cover has chalked up the striking record of being on hand at no less than 46 of the 50 National Canners Assn.'s conventions. He heads The United Co. of Westminster, Md., which makes corn canning machines.

Dr. Herbert J. Dutton, USDA, has been awarded $1,000 and an honor plaque by Glycerine Producers Assn., New York City, for his contributions to the knowledge and use of glycerine.

William Innes Drynan, Canadian Canners Ltd., is newly elected president of Canadian Food Processors Assn.

A. C. Fisher, Dr. A. C. Fay, Robert C. Hibben, and Dr. A. C. Dahlberg have been re-elected president, v.-p., treasurer, and secretary and advisor to the board, respectively, by Dairy Products Improvement Institute, Inc., Ithaca, N. Y.

Willard B. Gorsuch has joined Dole Hawaiian Pineapple Co., Ltd., Honolulu, as assistant treasurer.

Dr. Clell B. Hartley has been named Research Laboratory Manager of Fairmont Foods Co., Omaha, Neb.

L. H. Hogue will become president of Paulus Bros. Packing Co., Salem, Ore. He succeeds George B. Paulus, who is retiring.

Walker T. Howell is the newly appointed industrial engineering supervisor for Farimont Foods Co., Omaha, Neb.

Edward J. Jordan has been elected president of Beech-Nut Life Savers Inc., Canajoharie, N. Y. He succeeds J. Stafford Ellithorp, who will serve as vice chairman of executive committee, and member of board.

Vincent J. Kirby has been appointed sales and advertising manager of Burry Biscuit Corp., Elizabeth, N. J.

Edward J. Kowalcyk and Le-

Competition and food emulsifiers

Ever since the day two men started offering the same food product in the same market place, the food manufacturer has had to make a choice—either say his wares cost more because they are better, or find a way to make them better and yet cost the same or less. More businesses have been built on the latter than the former.

The hundreds of tons of monoglyceride emulsifiers that have come from our plant have done a bit to solve this competitive dilemma. For *Myverol Distilled Monoglycerides* happily cost less than the usual monodiglyceride reaction mixtures, when measured on the scale of emulsifying effectiveness. The scales tip even further when you add the production economies they often help achieve.

Now about product quality. Here are two examples of what you can expect.

In peanut butter, experience with one type of *Myverol* has shown that it will not only stabilize and protect against "oil out" but will also confer the bonus benefits of 1) less stickiness in the mouth and 2) a very wide temperature range for the consistency that consumers like.

Or take household shortenings. With *Myverol*, shortenings can be produced that make a smooth cake batter of the right consistency, one that bakes to superior volume with controlled porosity.

And so on. Since *Myverol Distilled Monoglycerides* come in several forms, made from a choice of fats and oils, it is possible to select the emulsifier that is exactly right for the effect sought in your product.

The best way to find out how much you can save with Myverol Distilled Monoglycerides, how Myverol can improve your products, is simply to try it. To get under way, write ***Distillation Products Industries,*** Rochester 3, N. Y. Sales offices: New York, Chicago, and Memphis • Gillies Inc., Los Angeles, Portland, and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

distillers of monoglycerides made from natural fats and oils

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For concealed piping on new installations. This unit is removable and the entire assembly is covered by an attractive stainless steel plate.

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STRAHMAN VALVES, INC. 16 HUDSON STREET NEW YORK 13, U. S. A.

roy A. Rice are newly appointed assistant v.-p.'s of Arnold Bakers, Inc., Port Chester, N. Y.

B. E. Lawrance, manager of John Morrell & Co., Oakland, Calif., is new general manager of firm's West Coast division.

Fred T. Morton, treasurer of Keebler Biscuit Co., Buffalo, N. Y., is retiring after 14 yr. with company.

Donald Clinton Power has been elected to the board of Canada Dry Ginger Ale, Inc., New York City.

Industry

Corn Products Refining Co. announces completion of negotiations for acquisition of Refined Syrups & Sugar Co.

Gerber Baby Foods Co., has broken ground for a 55,000 sq. ft. warehouse in Rochester, N. Y.

Hershel California Fruit Products Co. has changed its firm name to Contadina Foods.

Pepsi-Cola General Bottlers, Inc., announces opening of new $2,700,000 bottling facility in Chicago.

Associated Industries

Bagpak Div., International Paper Co., New York City, will start construction on a multiwall paper shipping sack plant in Litchfield, Ill.

Celon Co., reports election of Joseph S. Adams as president.

Cleveland Automatic Machine Co., Cincinnati, announces its merger with J. H. Day Co., Inc., of the same city.

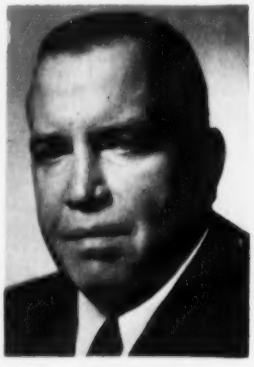
Crane Packing Co., Chicago, maker of seals and packings, has undertaken a broad construction program encompassing erection of four new plants and expansion of a fifth.

Crown Cork & Seal Co., Inc., has elected John F. Connelly as chairman of its newly formed executive committee.

Day Sales Co., Minneapolis, has been organized as a subsidiary of the Day Co. It will engineer and install equipment manufactured by the company.

Dorr-Oliver Inc., Stamford,

Dr. J. A. Anderson, director of the Grain Research Laboratory, Winnipeg, Manitoba, has been named to receive the Thomas Burr Osborne Medal. His outstanding work on malting barley and bread wheats is cited. Presentation will be made by the American Assn. of Cereal Chemists at its meeting next month in San Francisco. Established in 1926, the medal has been awarded only nine other times.



William M. Grosvenor, Jr., has been appointed director of research and development for American Sugar Refining Co., New York City.

Curtis H. Gager has been elected executive v.-p. of Coca-Cola Co.

A new line of Standard Oil greases

RYKON

GREASE

Major breakthrough in grease technology results in development of new thickening agent. New grease has greater high temperature stability, superior multi-purpose qualities, improved lubricating properties.

Standard Oil instituted a grease research and development project several years ago. The result of this work is the line of RYKON Greases, which contain a unique new non-soap, organic thickening agent.

RYKON Greases surpass in stability and performance the best greases made up to this time. They bring to industry new opportunities for improved machine performance. They greatly reduce the maintenance and grease handling problems encountered in industry.

RYKON Grease properties

RYKON Greases are smooth, buttery-textured greases, made from the finest quality, solvent-extracted oil. Their thickening agent is a Standard Oil exclusive. RYKON Greases have these high-quality characteristics:

High temperature stability—Better heat stability than any other petroleum oil grease. ASTM dropping point of 480°F. Maintain consistency in service at high temperatures.

Mechanically stable—Maintain consistency even under severe mechanical working in service.

Chemically stable—Inhibit oxidation. Oil and thickening agent in combination possess extremely good chemical stability.

Wide temperature range—Lubricate at high and low temperatures. Extended range of application thus obtained makes RYKON Greases truly multi-purpose.

Water resistance—Do not lose consistency in presence of water. Highly resistant to water washout.

Oil separation—Minimum bleeding of oil in service and storage.

Anti-rusting—Exceptional natural rust preventive characteristics.

With RYKON Greases, lubrication can become simple, foolproof and less expensive—much less expensive, perhaps, than a single shut down caused by equipment failure due to the use of the wrong type of grease or the use of an "economy" grease lubricant.

RYKON Greases come in four Regular and three Heavy-Duty grades. Thus there is a RYKON Grease to take care of every grease lubrication job. Using RYKON Greases plant-wide can reduce your grease storage requirements, simplify lubrication maintenance training, cut down record keeping, save on dispensing equipment and reduce investment in grease inventories.

Get more facts about RYKON Greases. Call your nearby Standard Oil industrial lubrication specialist in any of the 15 Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Check Chart Of RYKON Greases

Regular Line	Grade Consistency
RYKON Grease No. 0	0
RYKON Grease No. 1	1
RYKON Grease No. 2	2
RYKON Grease No. 3	3
Heavy Duty Line	
RYKON Grease No. 0 E. P.	0
RYKON Grease No. 1 E. P.	1
RYKON Grease No. 2 E. P.	2

STANDARD

STANDARD OIL COMPANY (Indiana)

getting there is only half the job!

CAPACITY

Choose from ½ to 3 H.P. in Copelametic, the direct-drive accessible hermetic, and economical belt-driven models. Model TR-100 shown.

DEPENDABILITY

Thousands of Copeland units now in use have given years of trouble-free, over-the-road service—proof of superior engineering, ruggedness and dependability.

AVAILABILITY

Our unexcelled coast-to-coast network of 130 wholesalers and over 25,000 refrigeration dealers means the best in service when you need it. It's only a phone call away.

Copeland refrigeration does the rest . . . keeps food fresh!

This Indian's way of transporting venison back to the feast was picturesque . . . and that's about all. Today to avoid spoilage and flavor loss, we turn to refrigeration for practical reasons: freshness and profit. Fleet operators and food processors protect in-transit payloads with refrigerated trucks equipped with dependable Copeland units.

Whether holdover or over-the-road, a Copeland unit protects valuable perishables. Plugged in at stops, or driven directly, a Copeland truck unit produces cooling you can count on all the way . . . at lowest cost per mile.

SINCE 1918

Copeland REFRIGERATION CORPORATION, Sidney, Ohio

WRITE FOR SPECIFICATIONS AND PERFORMANCE DATA

Conn., has appointed Glen G. Reed director of Filtration Technical Div., and Glen O. Wilson director of Industrial Technical Div.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., plans to build a new cellophane plant near Tecumseh, Kan.

John C. Brown is newly elected president and member of board of Coca-Cola Bottling Co. of Ohio. He succeeds H. W. Easterlin, who has retired.

H. K. Porter Co., Inc., New York City, has elected Charles L. Holber president.

Hercules Powder Co., Wilmington, Del., has named Dr. Robert H. Cotton to head the newly created starch and protein section of its Virginia Cellulose Div.

Hoerner Boxes, Inc., Keokuk, Iowa, reports election of J. V. Wilson as executive v.-p., also appointment of L. D. Wilson to post of general manager of its Little Rock, Ark., plant.

National Wooden Box Assn., Washington, D. C., has elected Thomas Munroe president.

Pfaudler Co., Rochester, N. Y., has named Ernest W. Neben as director of central engineering.

Pittsburgh Corning Corp., Pittsburgh, has chosen Russell Brittingham to succeed H. B. Higgins as president.

Technical Assn. of the Pulp & Paper Industry announces the election of Ward D. Harrison, v.-p. and general manager of production for Riegel Paper Co., New York City, as its president.

A. Edward Brown, v.-p. of Michigan Fruit Canners, Inc., Benton Harbor, Mich., has been elected president of National Canners Assn.

Southland Paper Converting Co., Los Angeles, has changed its company name to Fortifiber Corp.

Standard Packaging Corp., New York City, reports acquisition of Fuller Label & Box Co., Pittsburgh; Allegheny Label, Inc., Cheswick, Pa.; Gebhart Folding Box Co., Inc., Dayton, Ohio; and Bradley & Gilbert Co., Inc., Louisville, Ky. Further, it has elected Henry F. Scheetz, Jr., to its board.

Deaths

J. Willis Beidler, 47, director of C. H. Musselman Co., Biglerville, Pa.

John G. Clifford, 48, managing director of Massachusetts and Rhode Island districts, General Ice Cream Div., National Dairy Products Corp.

Richard M. Draeger, plant superintendent of Pabst Brewing Co., Peoria, Ill.

Herschel M. Duncan, 67, president of Duncan Coffee Co., Houston, Tex.

Mrs. Henry Clay Marshall, cofounder of Bama Pie Co., Dallas, Tex.

Fred A. Voss, 64, president of Voss Brothers Bakery Co., and v.-p. of Tampa Sales Corp., both of Denver.

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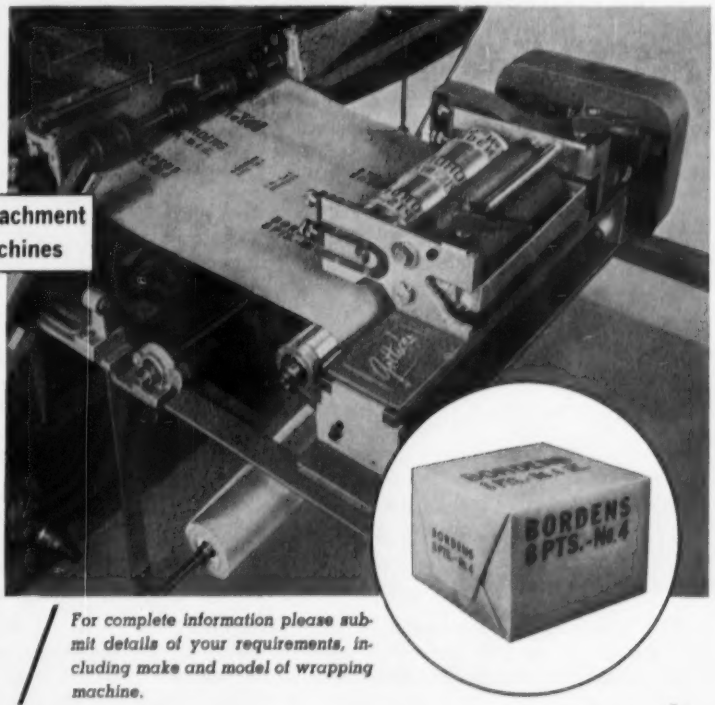

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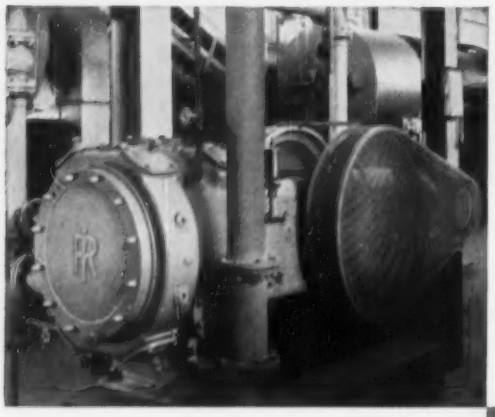

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(Air-cooled units . . . ½ to 7½ hp)

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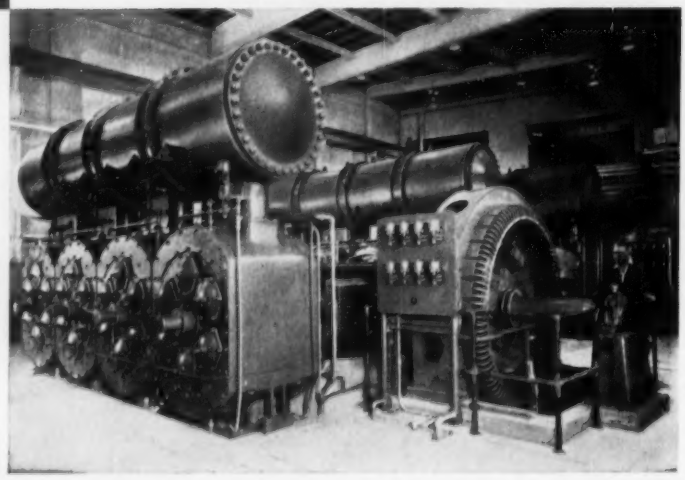
Each one of three 2000-hp Ingersoll-Rand HHE vacuum pumps has a piston displacement of 51,508 cfm. These units exhaust air from large test chambers used to simulate high altitude conditions.



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ADVANCES IN TECHNOLOGY

Dispersibility of "Instants"

Wettability of instant dry milks results from distribution of salts, lactose, and proteins, and the increase in particle size.

The large size—80-20 mesh, compared with 200-mesh for spray-dried nonfat milks—and shape of particles keep them farther apart as they reach surface of water. And their greater weight produces more rapid breaking of water surface tension. By these effects each particle receives sufficient solvent for solution.

Orientation of salts and lactose toward surface of particles provides readily soluble components for rapid wettability. Less soluble components are oriented toward center of particles and are more readily dissolved after salt and lactose have gone into solution.—*Food Research*, 69-75, Jan.-Feb. 1957.

Soy Sauce Quality

Flavor of soy sauce is related to amount of salt, amino acids, organic acids and sugars. Aroma is due to the voltatile aromatic compounds.

Most important factor in flavor seems to be salt content. Optimum lies between 18.7 and 20.4g./100 ml. An unusually high concentration impairs the flavor, and when the amount falls below 13g. mold develops in storage.

Of the samples tested, those having the highest titratable acidity were rated best in flavor and aroma. This was also true with the samples having highest total nitrogen. Amino nitrogen content of total nitrogen in preferred samples was relatively low, however.

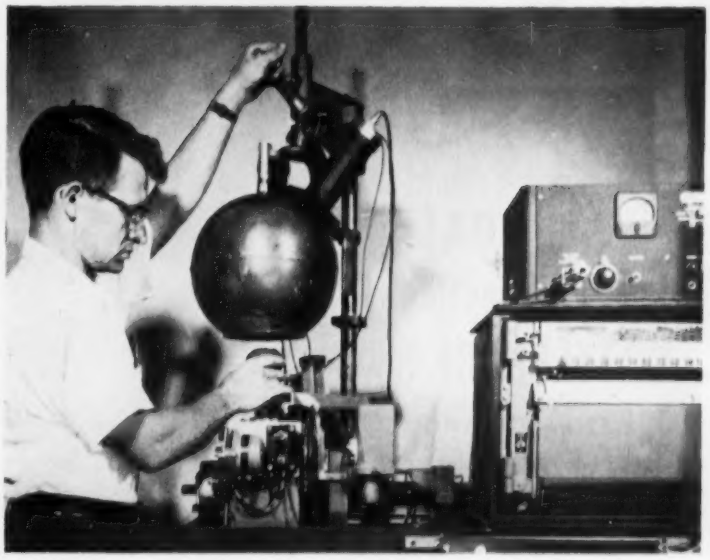
Amino acids found were: alanine, arginine, aspartic acid, glutamic acid, glycine, luecine, lysine, methionine, phenylalanine, proline, serine, threonine, and valine.—*Food Research*, 83-87, Jan.-Feb. 1957.

Packaging Plastic Foods

Cheese or other plastic foods can easily be packaged in wedge-shaped blocks, according to procedure revealed in recent patent specifications.

A preformed envelope of pliable material is placed in a supporting mold and filled with fluid cheese. The open end of the envelope is sealed, and the package is removed and placed in a supporting liner of stiff material having a thickness of 0.02 in. Two or more filled liners are superimposed in a carton to form a rectangular package which is then cooled to thicken the product.

When the carton arrives at the retail outlet, liners are removed and unfolded to free the wedges. Any even number of wedges may be stacked to form a rectangular block. The procedure makes it unnecessary to handle the wedges, possibly deforming their sharp edges and smooth surfaces.—U. S. Patent 2,777,770, Jan. 15, 1957.



Experimental Unit Looks Inside Fruit And Tells If It's Good To Eat

An instrument that measures and records the amount of light transmitted through whole fruit has been developed by research engineers of the Agr. Marketing Service, USDA.

It has been used successfully to determine the quality of tomatoes, and other fruits varying in size from tomato seeds to grapefruit. Plans are now under way to use it on watermelons.

Called the Recording Photometer for Biological Spectral Transmission —Rephobiospect for short—the instrument yields information that can be related to certain established quality factors.

In its operation, a monochromator breaks up the light passing through the fruit into various colors so the sample is illuminated first with red light, then orange, yellow, etc.

Meanwhile a phototube focused on the fruit produces an electrical signal proportional to the amount of light passing through it. This signal is automatically recorded on paper, giving a graphic expression of the color.

At present the instrument is strictly a research tool. But certain changes in its elements should permit its commercial use.—*Agricultural Marketing*, 3, Feb. 1957.

Bacteria in Dressed Poultry

Dressed, eviscerated poultry increase in bacteria count during processing, from a range of 600-800 per sq. cm. of skin surface on live birds,

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It is now permissible to use Antifoam A Compound in processing nonstandardized foods at concentrations up to 10 ppm—water dilutable Antifoam AF Emulsion at concentrations up to 34 ppm.

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Advances in Technology

to 50,000-600,000 on birds in the chill tank prior to packing.

Bacterial population per sq. cm. of visceral cavity surface was usually lower (1400-12,000) than on the skin of the same birds (4,000-93,-000) on swab samples taken immediately after evisceration. However, Coliform counts were higher for the visceral cavity than for the skin surface.

On poultry stored in polyethylene bags at 40F. several types of organisms developed, including *Pseudomonas-Achromobacter*, *Flavobacterium*, Micrococci, Coliforms, and *Cryptococcus* (*Torulopsis*) yeasts. At the end of the 12-day test storage period, the microflora were predominantly *Pseudomonas-Achromobacter* types.

Undesirable odors and slime formation appeared in the test birds on the 4th to 6th day of storage. The increase in bacteria in eviscerated poultry can be attributed to distributing, by washing and handling, of microorganisms on feet and feathers of the birds, and in their feces and intestinal contents—*Applied Microbiology*, 345-349, 1956.

Fructose From Mannitol By Fermentation

Good yields of fructose (levulose) can be produced by fermentation of D-mannitol solutions with *Acetobacter suboxydans* (Strain NRRL B-72).

Production was carried out in shake flasks, 30-liter, 50-gal., and 500-gal. fermentors. Mannitol concentrations of 5-25% were supplemented by yeast extract, peptone, brewers' yeast, corn-steep liquor, and some nutrient salts. All gave good yields of fructose.

In pilot fermentations brewers' yeast proved to be a good nitrogen supplement. In 50- and 500-gal. units, yields of 97% or more on solid present were obtained after fermentations of 25-48 hr. at 82.4F.

Final concentration of 18% fructose in the fermented liquor was found most satisfactory for timing and recovery operations in the 500 gal. stage.—*Applied Microbiology*, 316-322, 1956.

Peanut-Cocoa Confection

By mixing peanuts with other nutritive materials, particularly sugar and cocoa, in accordance with a patented process, a confection is formed that can be consumed in its manufactured condition or incorporated in pastry and other desserts.

After roasting, nuts are cleaned, stripped of their skins and degerminated. They are then mixed with sugar and cocoa (with or without other flavor) and ground into a paste.

Paste is then treated in a rolling mill in order to convert it into a powder of extreme fineness. Subsequently the powder is returned to the grinder where the powder is converted into an unctuous paste.

In the final product cocoa may represent 6-10% with sugar and peanuts representing 40-45% each. In spite of the fact that the proportion of cocoa is low, the product has the flavor and scent of a genuine chocolate praline.—U.S. Patent 2,780,549, Feb. 5, 1957.

Edible Food Powders

An improved method for making dehydrated vegetable soups which are reconstituted by addition of milk or water is the object of a recently patented process.

Basic to the invention is a starchy food powder, such as potato, to which the desired vegetable (or vegetables) is added. Addition may be in any proportion, up to substantially 100%.

Using tomato as an example, it is cooked, mashed to a finely-divided state and, while still wet, added to the cooked potato powder. Mixture is then dried. If the tomato is added in stages, a cooked food powder of any desired proportion can be obtained.

During the process, tomato skins are separated from flesh and are easily removed from the dried powder. Drying temperature should not rise above 123F. Powders can be made containing several cooked vegetables or other cooked foods such as meats, and are readily reconstituted by the addition of hot water, milk, or both.—U.S. Patent 2,777,771, Jan. 15, 1957.

Factors in Foam Stability

Beer foaming agents have their origin in barley proteins and are developed, as well as modified, by malting and mashing processes, and by hopping and cellar procedures.

High-protein barleys yield beer of better foaming quality than barleys of low-protein, and the use of not over 10% cereal adjuncts in the mash

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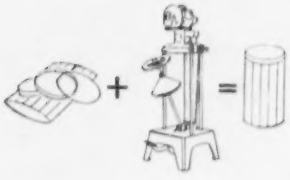

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may also improve foam. Under-modified malts are better than over-modified ones, and high-dried malt will give better foam than low-dried, though at the expense of a darker colored beer.

Cold fermentations improve foam, and storage time should not be too extended, 6-8 weeks being about right for normally hopped beers of 10-12 deg. Plato original gravity. Too sharp a filtration can spoil foam as can excessive overfoaming during bottling, and too low a carbonation. Finally, improper serving can spoil even the best beer foam.

To test effect of hops on foam production, 4 parallel brews (94 bbl.) were made using 13, 18, 23, and 28 kg. of hops per brew (0.035, 0.422 0.539, and 0.656 lb./bbl., respectively).

Finished beers showed no important differences in analysis except for increasing bitter substance content (43.6-68.8 mg./l.). Foams measured by several experimental methods improved with increased hop additions. On pouring into glasses, however, effect on the "head" was not especially pronounced. — *Schweizer Brauerei Rundschau*, 68, 1, 1-5, 1957.

Process Guards Color Of Frozen Products

Partial enzyme inactivation by mild heat treatment followed by freezing is a patented method for preserving raw solid fruits and vegetables, that are said to maintain their color, taste, and appearance after long periods of storage.

In case of peaches, the fresh fruit is washed, peeled, pitted, and sliced in the usual manner. Pieces are then immersed in hot syrup until enzymes in their surfaces are inactivated.

The heat treatment must not be so severe as to inhibit the enzymes throughout the slices nor to cause sterilization or cooking. Proper time and temperature can be ascertained from pilot tests in which a 1% aqueous solution of catechol is applied to a freshly-cut cross-section of fruit. That part of the surface that has been inactivated will retain its color, whereas the surface wherein the enzymes are still active will turn dark.

Liquid used as a heating medium will vary with material treated. A 0.5-2% solution of salt is suggested for vegetables, and a 30-60% sucrose solution for fruits. Ascorbic acid is usually a minor ingredient of the syrup—U.S. Patent 2,780,551, Feb. 5, 1957.

Oversized Cooling Coils Help Offset Frosting

Heavy deposits of frost on air-cooling coils will seriously impair the efficiency of a refrigeration system.

This and other conclusions were reached in a test of wide- and close-finned coils covering a wide range of air velocities and at various accumulations of frost. Factors most critically affected were coefficient of heat transfer and pressure drop of air through the coil.

With constant air flow, overall coefficient of heat transfer increases slightly as the frost begins to collect, but decreases thereafter as the frost

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Clark Equipment Company
Battle Creek, Michigan

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diSPo-cups—the safe, convenient way to store or transport lab specimens. Plastic coated interior resists leakage or absorption. Space on cup and cap for data. 8 oz.

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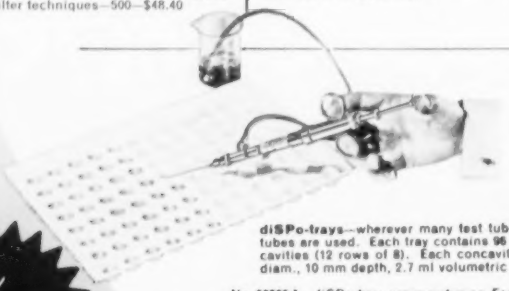

diSPo-trays—wherever many test tubes or culture tubes are used. Each tray contains 96 cups or concavities (12 rows of 8). Each concavity has 20 mm diam., 10 mm depth, 2.7 ml volumetric cap.

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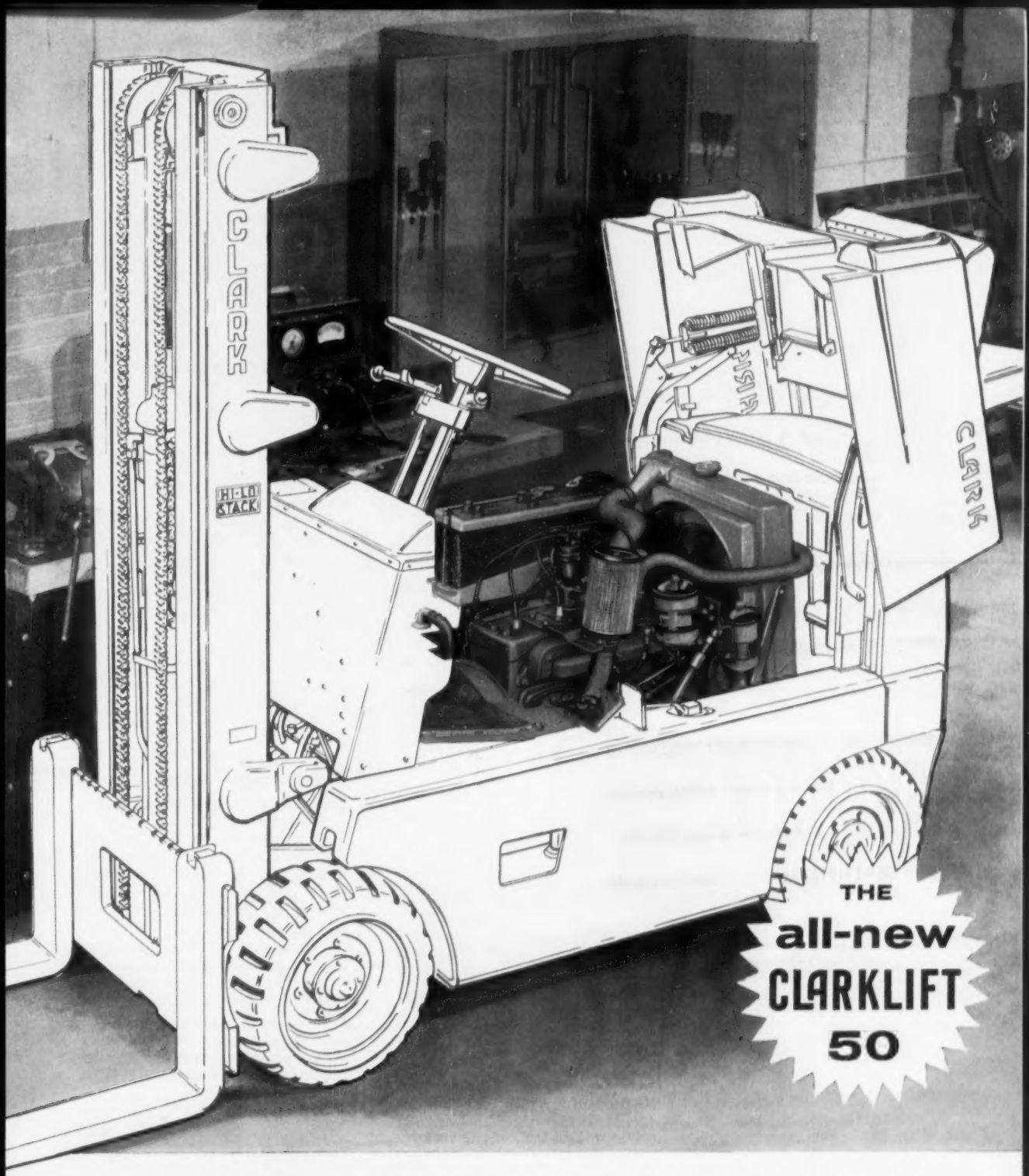

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thickens. Magnitude of decrease is not of general concern, but reduction of air flow, due to restricting of passages, will lower efficiency. In fact, the drop in air-flow rate is the best guide to the adverse effect of frost on coil performance.

If two coils have equal overall dimensions, the close-finned one will be more efficient than the wide-finned when frost accumulation is light. The reverse is true, however, as the frost builds up because of the excessive drop in air flow through the close-finned coil.

If a wide-finned and a close-finned coil are selected to give equal performance under frost-free conditions, the former will allow a higher refrigerant temperature under all conditions of frost and will be more efficient.

The tests indicate that it is desirable to oversize the coil if it is to be operated under frosted conditions. The larger coil allows higher refrigerant temperature and longer operation before defrosting. — *Refrigerating Eng.*, 42-46, Feb. 1957.

Water Retention in Meats Increased by Phosphates

Addition of phosphates to ground meat has a marked effect on moisture retention, varying with ionic strength and pH of solutions, time and temperature of treatment, and other factors.

Laboratory studies have been reported dealing with the treatment of lean beef with NaCl, pyrophosphate-NaCl, and other additives.

In a study of heated and unheated samples it was found that those treated with NaCl were linearly related, while a curvilinear relation existed in those treated with pyrophosphate-NaCl. In the latter, the tendency to retain moisture on heating increased with increase in alkalinity and ionic strength of the solutions.

Time and temperature studies showed importance of maintaining low temperatures to get optimum moisture retention with phosphate additives. No similar effect was noted on volume of samples treated only with NaCl. Best results with phosphates were obtained after storage for 16 hr. at 32 F.

Addition of potassium and sodium iodides markedly enhanced moisture retention with an effect different from and greater than that of other additives. — *Food Technology*, 546-52, Nov. 1956.

Food Warming Package

A package for ready-to-eat bakery products, so constructed that it is possible to warm the food by steaming while in the package, is the object of a recent invention.

Package comprises an open top box with spaced vents in its bottom. These are formed by struck-out individual tongues that stay flush with the bottom until forcibly pressed into commodity space.

Following insertion of products, entire box is wrapped in an imperforate air-tight wax paper. To heat the food, paper over vents is punctured and tongues in box are pushed upward.–U.S. Patent 2,777,769, Jan. 15, 1957.

Metal Soaps In Dry Mixes Improve Quality of Cakes

When certain metal soaps are used in making foam batter cakes from dry mixes, the result is a uniform product, easily reproducible with respect to volume, texture, and other characteristics.

Typical of products used in a recently patented process are calcium, sodium, magnesium, and aluminum salts of oleic, myristic, stearic, and palmitic acids. In general, metal soaps or fatty acids containing two or more double bonds will give the desired results with either 2-package or single-package mixes.

By way of example, 3 cakes were prepared from a 2-package dry mix, identical in ingredients and procedure except that the first contained no metal soap. The second had 50 mg. of calcium stearate intimately mixed in package No. 2. Third cake contained 50 mg. of magnesium stearate (well mixed with 5g. of $CaCo_3$ folded into the whipped egg white of package No. 1 after the contents of package No. 2 had been folded therein.

After baking, the cake without metal soap measured 103 mm. in the

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(Simple O-Ring that can be removed without tools of any kind. Proved in service since 1949.)

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(Viking parts are ruggedly built, easy to handle and easy to clean. All parts completely sanitary. 3A approved.)

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Housewives find the convenience of this new pouch bag containing frozen shrimp irresistible. It is moistureproof, airproof, odorproof and lightproof. Pop it into water – package and all. Cook without a trace of shrimp odor. Cool and serve.

The new package consists of three layers – printed aluminum foil, a special 15-pound paper, and a 1 mil interior coating of Du Pont ALATHON. ALATHON polyethylene resin provides a perfect heat seal, which prevents dehydration and freezer burn as well as a seal that will not break down when the package is immersed in boiling water. The coating of ALATHON is applied by the Reynolds Metals Company, Louisville, Kentucky, for the Sea Pak Corporation, St. Simons Island, Georgia.

ALATHON is non-toxic and imparts no odor or taste to food products. Coatings of ALATHON resist oils, greases, acids, and alkalies. ALATHON stays flexible and strong at temperatures low enough to keep foods frozen and high enough for cooking. Strong, lasting heat seals can be made between films of ALATHON in the temperature range of 250° to 300°F., yet it shows little or no tendency to stick to other materials at temperatures below 200°F.

These attractive "cook-in" bags are only one of the packaging innovations made possible through the imaginative use of ALATHON polyethylene resin. For more complete information on the versatile properties of ALATHON, and how they can make a better package for your product, simply clip and mail coupon.

There is a difference in polyethylene resins – specify an **ALATHON®** *for your packaging needs*

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Please send me more information on Du Pont ALATHON polyethylene resin. I am interested in evaluating this material for:

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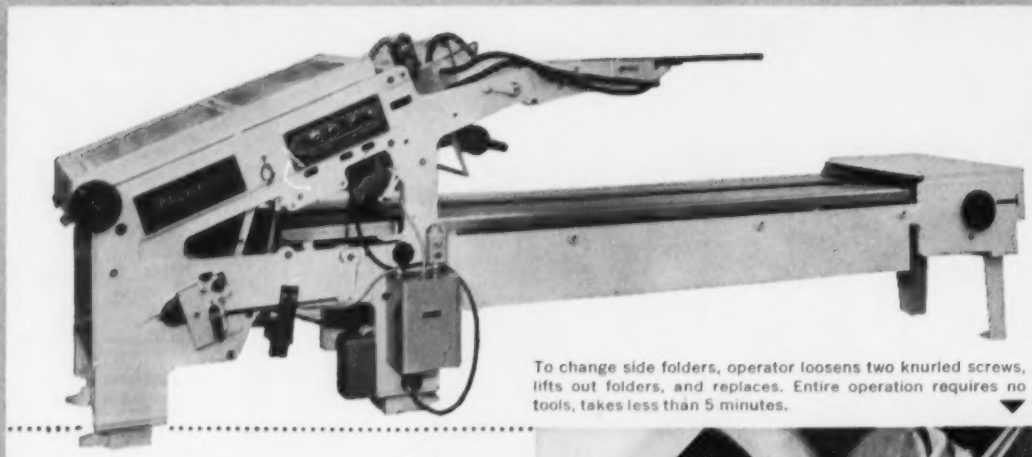
HOW ARMOUR STAR GETS QUICK SIZE CHANGES



To change side folders, operator loosens two knurled screws, lifts out folders, and replaces. Entire operation requires no tools, takes less than 5 minutes.

U-61 GIVES MAXIMUM FLEXIBILITY

With the U-61 Double Point Folding Machine wrapping its packaged meats, Armour can change sizes quickly and easily. All that is required is a simple replacement of side folders, which the operator does without tools. Handwheel adjustment of paper width automatically adjusts electric eye registration, too, for scanning head is mounted to move with paper side guide.

The U-61 handles slight differences in package heights automatically, allowing for ⅛" variations. Straight roller discharge (shown above) moves finished packages off the machine onto a belt or table. Optional right angle side roller discharge can be set on the same side as the operator, or on the opposite side.

With a Model U-61, you can wrap a size range from 4" to 16" in length, 3" to 6" in width, and 1" to 3" in height, using cellophane. Wax paper or foil may also be used, but require special refrigeration at discharge as shown in illustration. Speed range is from 15 to 40 a minute. To find the cost-cutting advantages the U-61 can bring to your operation, contact your nearest Package representative.

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9-in. pan. Each of the others measured 114 mm. Texture of all cakes was considered good. One-package cake mixes of the foam batter type are particularly improved by the addition of metal soaps, forming a cake 120. mm high.—U.S. Patent 2,776,893, Jan. 8, 1957.

Flywheel Explosion Action Features New Spin Mill

Powders having half or more of their particles in the 1-5 microns dia. range are obtained in a new mill.

In it, materials are pulverized without contamination by bearing grease or foreign matter eroded from grinding balls or hammer blades. And if a refrigerant is used in the jacket, the effluent can be discharged at a very low temperature.

The experimental mill consists of a rotating disk 1 in. thick x 6 in. dia. and turning at 42,000 rpm. inside a circular housing with a clearance of 0.020-0.060 in. between rotor and housing.

The feed, previously reduced to 40 mesh, enters at one side of the rotor, in a stream of gas (air, nitrogen, helium, carbon dioxide, Freon, and sulfur hexafluoride have been used), and passes into the annular space between rotor and housing. The ground product leaves through a port in the housing on the opposite side of the rotor, through a settling chamber and bag filter. About 80% of the solids collect in the settling chamber.

The pulverizing effect of the "spin mill" was not greatly affected by changes in rotor thickness, clearance, or rate of gas and solids feed. Median particle diameter decreased with increasing rotor speed up to about 500 fps., after which the percentage change was small.

Impact, abrasion, or collision of particles with each other do not explain the pulverizing effect obtained in the mill. The size reduction seems to be due to a spin imparted to the particles in the mill so that they rupture by a "flywheel explosion" effect. This has been verified by experiment.

Particle rotation speeds are very high; a particle 60 microns in dia. must spin at 200-million rpm. in order to rupture. The mill can fracture particles 10 microns in dia. which, at maximum rotor speed, would acquire spinning speeds of over 500-million rpm.—*Ind. & Eng. Chem.*, 170-73, 1957.

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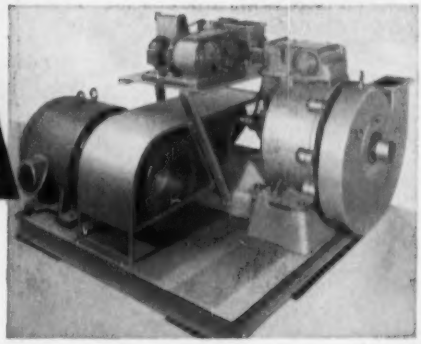
use a SCHUTZ-O'NEILL PULVERIZER



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If your product must be pulverized to ultrafine specifications and yet have controlled particle size distribution, you'll find proven Schutz-O'Neill "Superfine" Pulverizers best for the job.

Many products that are heat sensitive can be pulverized safely too, because the grinding principle of impact with air attrition keeps product temperatures down and helps control humidity.

Versatility of the Superfine Pulverizers makes them adaptable to the complete range of grinding from coarse to ultrafine. Schutz-O'Neill Superfine Pulverizers are used in the paint industry where ultrafine pigments with close particle size range are vital; by major cocoa powder, sugar, spice and pharmaceutical manufacturers; for emulsifier gums, resin, plastic and seaweed extract powders—wherever unexcelled quality grinding is required. Offered in 6 sizes ranging from 7½ to 125 HP with grinding chambers 12" to 28" in diameter.

FREE TEST GRIND OF YOUR PRODUCT in our test lab! Tell us your milling requirement—fineness, uniformity, increased output, lower cost—send us a sample of the stock you want to pulverize, state fineness and capacity desired. You'll receive back your processed product plus our Engineering Test Report—there's no obligation.

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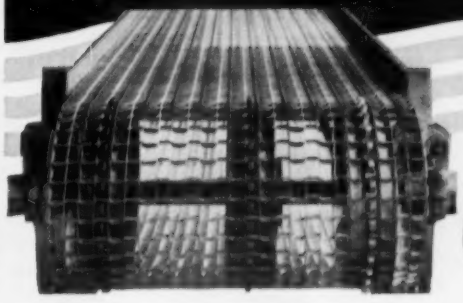

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Whether you are processing, packaging, shipping, or storing, this all-purpose conveyor belt will give you years of dependable, economical service. Available in ½" x 1" also 1" x 1" in any length and practically any width.

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Ask your Mill Supplier or write for illustrated literature, prices.

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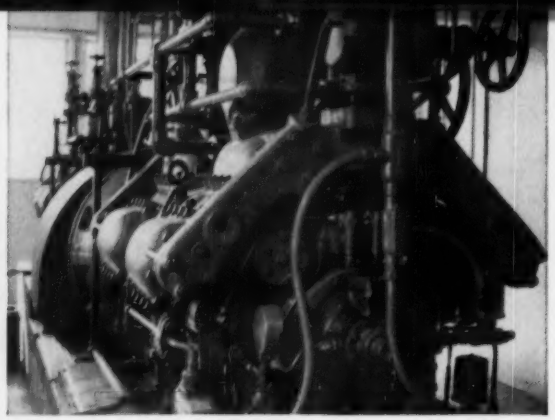
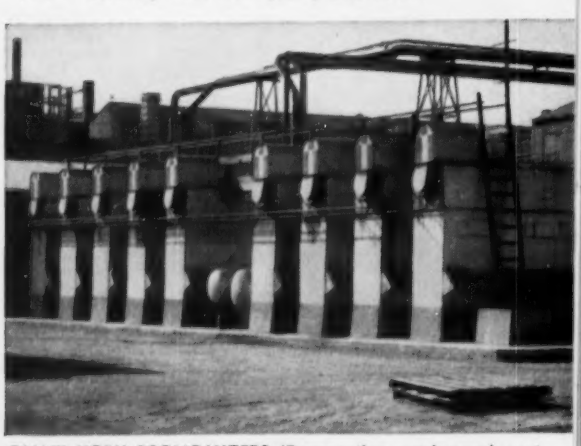
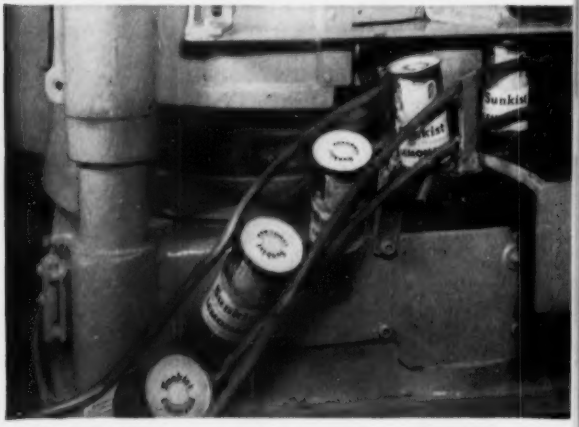


EARLY YORK PLANNING helped solve refrigeration problems at Exchange Lemon Products Co. Above two York V/W compressors powered by 300 HP motor provide refrigeration for low temperature evaporation process. Here fresh fruit juice is concentrated by boiling at a temperature of +65°F. to +70°F. assuring fresh fruit quality and flavor.



GIANT YORK ECONOMIZERS (Evaporative condensers) part of various refrigeration systems utilized in phases of processing. Quality control is essential since lemon juice and lemon by-products are used in many ways from tasty lemon drinks to perfume and pharmaceuticals.



FINAL STEP in juice production is can-closing. At this stage, cans are sent to freezing tunnel which is maintained at −40°F. Once quick frozen, product is sent to refrigerated warehouse where it is stored at −10°F.

SORTED LEMONS at world's largest integrated lemon processing plant, Exchange Lemon Products Company, Corona, California, start the Sunkist juice process with fruit transported by huge stainless steel conveyors.

YORK® PRIOR PLANNING SERVICE controls refrigeration costs by early analysis of system needs

- Major tasks assigned to today's refrigeration require major system expenditures.
- Thus, it is essential that the system incorporate its own safeguards for performance, accuracy, reliability, long life — without being over-engineered.
- York's 5-point PRIOR PLANNING SERVICE assures precise technical data on system needs early in the planning stages to help you, your consultants design a better system without costly changes later on.

No two refrigeration systems are exactly alike. The conditions vary, the job to be done varies, even the speed in which the same job is to be done often varies. Through Prior Planning Service, the York engineer can help owner, contractor, consultant on *any* refrigeration problem. By calling on his vast experience and training in refrigeration, he can provide a thorough and accurate analysis of system requirements, determine the exact characteristic of the variables which affect system design, including:

- **ambient conditions**
- **cooling rate**
- **constant or variable loads**
- **quantity of water**
- **lowest temperature required**
- **power source**
- **location of engine room**

Armed with this information, it is then possible to design a system that will meet the needs precisely, provide insurance against product spoilage or production downtime, allow for expansion without requiring an over-investment.

Through Prior Planning Service, the York sales engineer brings to your refrigeration problem unparalleled experience. York refrigeration system installations include the gigantic environmental laboratory for U. S. Navy, Trenton; Sunkist's Exchange Lemon Products Company, California; Carling Brewery, Natick, Mass.; Lehigh Valley Cooperative Farmers milk plant, Allentown, Pa.

You may rely with complete confidence upon the good judgment and recommendations of the York engineer. Call him *early* in your planning, or write York Corporation, subsidiary of Borg-Warner Corporation, York, Pennsylvania. In Canada, Canadian Ice Machine Co., Toronto.

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4. **INSTALLATION SUPERVISION.** When desired, York supervises system installation, tests and adjusts it, trains operators on how to utilize all of its outstanding capabilities.
5. **MAINTENANCE SERVICE.** When you specify York, a York Certified Maintenance Contract can also be specified assuring regular system inspection, 24-hour emergency service, all repairs, complete reports on the system's conditions.

York refrigeration air conditioning — *the quality name in refrigeration*

YORK B-W

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

YORK CORPORATION

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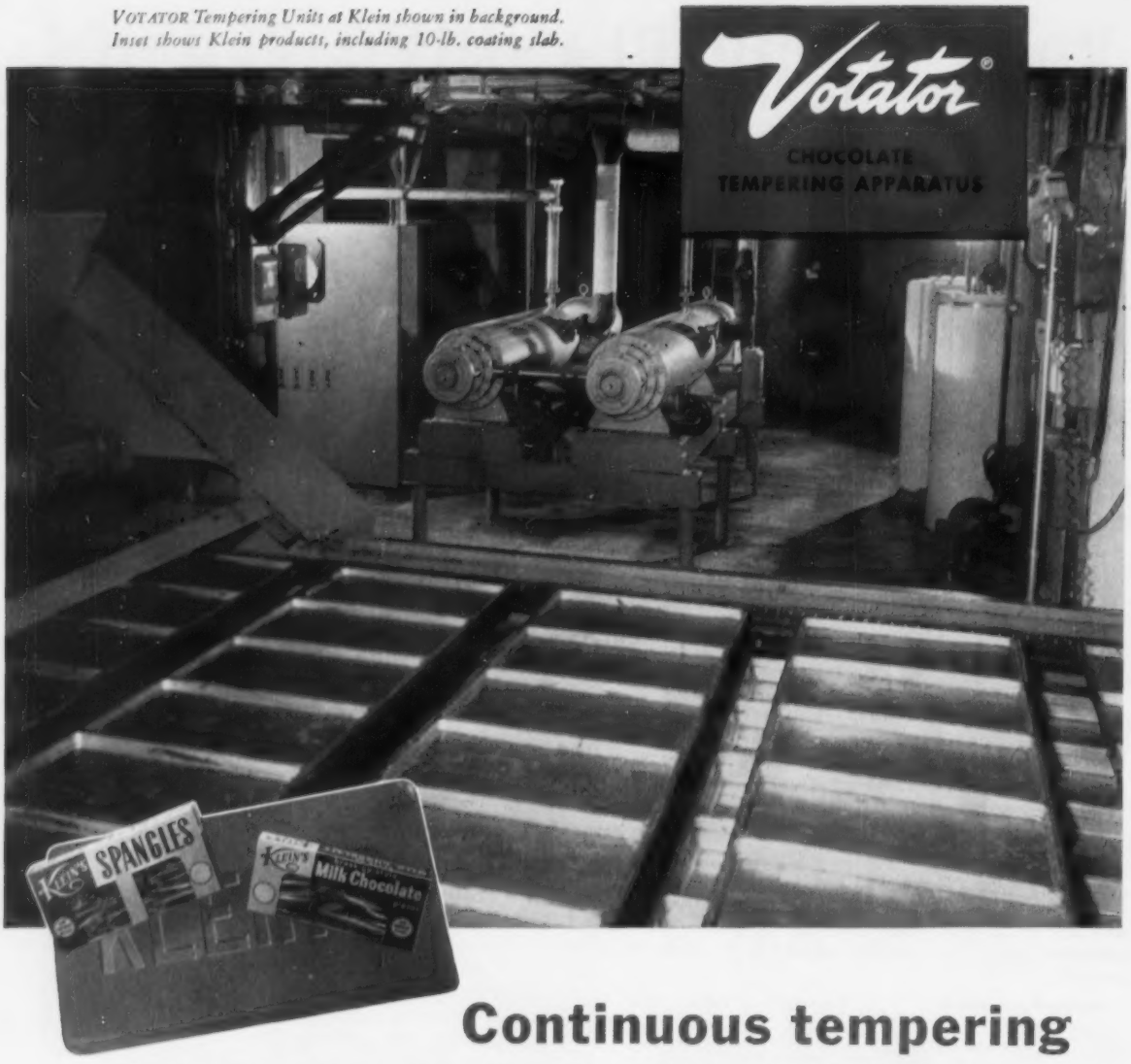
VOTATOR Tempering Units at Klein shown in background. Inset shows Klein products, including 10-lb. coating slab.



Continuous tempering improves grain texture at Klein

UNIFORMLY fine crystal structure is now assured hour after hour, day in and day out by VOTATOR® Chocolate Tempering Apparatus at Klein Chocolate Company. The tempering operation is greatly simplified. The molten chocolate is cooled and crystallized continuously, by means of the VOTATOR Chilling Unit, to the exact tempering temperature called for by the formula, and the tempered product is delivered to the depositor. Reheating and holding are eliminated. The apparatus cuts the cost of utilities and requires a minimum of maintenance. Processing variables can be quickly changed for various types of chocolate.

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QUESTIONS & ANSWERS

THIS MONTH'S PROBLEM

Frozen Spinach Souffle

Question—Do you have formula and instructions for making a top-quality frozen spinach souffle?

FEBRUARY PROBLEM

Handling Shortening

Question—We have a material-handling problem entailing much labor that could be saved if it were solved. We use considerable of plastic "Crisco" type shortening in our cake mixes. Due to density variations, amount needed for each batch must be weighed in this way:

Shortening in 55-gal. metal drums is unloaded by hand truck and placed in tempering room (75 to 80 F.). It is then hand-trucked to point of use, and shoveled out of drums (with short D-handled shovels) into a bin mounted on a scale. From bins, it is again shoveled into our pneumatically-operated "shortening stuffer."

Shortening is placed on top of the air-operated piston within a cylinder. *Then cover is clamped on top of the cylinder, and shortening is "stuffed" (by compressed air) into a mixer with other ingredients. Biggest part of this job is shoveling shortening. Can this problem be solved?*

Answer—Without knowing complete details of your process and product, we don't know if we're offering the best possible solution to your interesting material-handling problem. However, we can make suggestions that may lead to some improvement over your present methods.

If properties of the shortening would not be adversely affected by the physical change or temperatures involved, it should be relatively simple to liquefy the shortening and pump it. Presumably, the melting point is not much above 100F., so that shortening could be liquefied by storing it a few hours in a hot room equipped with radiators or unit heaters. Drums could be racked, so that the melted shortening would flow by gravity into a collecting tank, also in the hot room. If tank is in another room, it could be thermostatically controlled by means of a hot water jacket or heating coil.

From this tank, liquid shortening could be pumped into a scale-mounted weigh tank, and then piped into your mixer. Jacketed, steam-traced, or electrically-heated pipe lines would be used to keep shortening temperature above melting.

It might be well to make provisions for withdrawing the formula amount of melted shortening from the tank each time, so as to eliminate losses or errors from adhesion to weigh tank.

If a pump were used to transfer melted fat from weigh tank to mixer (instead of depending upon gravity) you could use a spray nozzle to distribute the liquid more uniformly than might be accomplished by forcing it in as a stream.

Should temperature alone be the drawback to this handling method, the mix temperature might be maintained at the desired point by adding a little dry ice to compensate for the heat introduced by the shortening.

It is possible that for process reasons the fat should not be liquefied before addition to the mixer. In that case, another approach could be tried. It would involve a quick heating of the drums of shortening from the outside—just enough to start melting of the shortening in contact with the heated metal drums.

Such heating might be accomplished by a controlled dwell in a hot room (as suggested above), by conveying drums through a tank of very hot water for just the right length of time, or by slipping steam coils around the drums and allowing them to heat for the correct length of time, as determined by experiment.

You might even look into the possibility of using infra-red lamps to heat the drums.

Immediately after this preliminary heat treatment (which could hardly have an adverse effect upon the bulk of the drum contents) drums would be elevated by a standard barrel dumper to slide shortening out into a tank. By mounting this tank on a scale, you could then shovel out the correct batch amounts into your stuffer. Admittedly, this would only eliminate half of your present manual labor, but this would be a step forward. The investment would also be relatively low, so that it might be possible to justify the change economically.

A final suggestion, we believe, offers still another possible solution, providing you obtain the cooperation of your shortening supplier. It's to establish mix formulas that would use fixed integral weights of shortening. Your supplier could then package and ship it to you in blocks of convenient weight so that a certain number of these blocks could be added to the mixer batch to give the formula weight without added handling.

For example, assume that a block of 50 lb. can be conveniently handled by one man and that the formula could be so proportioned that X number of blocks would go into each batch. Most likely, the blocks would be packaged in waxed paper-lined cartons, which could be cut open before use with a tool similar to that used by supermarkets for

---

Q.—Any reason why mushrooms can't be frozen!

A.—They're equal in flavor and appearance to canned mushrooms. However, few mushrooms are frozen commercially because of the long growing season and additional cost of preparation and storage. They're prepared for freezing in same manner as for canning. Only exception is dipping them in a 1%-citric acid solution, cold-water washing, draining, packing in moistureproof packages and freezing.

HOW TO DO IT?

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise). We pay space rates.

JUST ASK US

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

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Questions & Answers

opening shipping cases of packaged foods.

These blocks could be made rectangular and palletized for ease of handling, and return of empty drums would be eliminated. The over-all economics would determine whether this would be practical.

Professor Replies

Nub of the problem is getting the shortening from tempering room, into and out of weighing bin, into stuffer and then into mixer.

To solve it, it would seem that tempered shortening could be hand-trucked to scale, where it could be barrel-pumped, by weight, directly into mixer.

Obvious roadblock, however, is the bulk density of shortening. If it could be purchased on bulk-density specifications, a barrel pump could be rigged with a volume meter to greatly simplify the problem.

Suitable pumps include: Alemite Tornado, 1826 Diversey Parkway, Chicago 14; Anets barrel pump, Anetsberger Bros., Inc., of Northbrook, Ill.; Mallet drum pump, Mallet & Co., Inc., Pittsburgh; and Moyno pump, Robbins & Myers, Inc., Springfield, O.—*Roy E. Morse, Dept. of Food Technology, Rutgers Univ., New Brunswick, N. J.*

Reader Answer

Several years ago we encountered this problem and solved it in the following manner:

We instructed our supplier to keep sufficient quantities of shortening in his own tempering room so that when we required shipment, the shortening arrived at the specified temperature (75 F). He was also instructed to ship it via insulated van so that there would be slight chance of any appreciable temperature change from his tempering room to our storage area.

Rather than accept our large requirements of shortening in metal drums, we insisted that our supplier package it in 50-lb. blocks, encased in polyethylene bags and packed in heavy cardboard cartons. These cartons were fabricated so that they could be easily disassembled by a mixing crew and returned to the supplier for re-use. This method of packaging shortening was, however, more expensive than drums but the labor savings at our end more than offset the additional cost entailed.

We specified 50-lb. blocks because of the size of our mixer and the formula of our mix. The formula worked out for the mix crew centered around a given quantity of shortening put into the mixer. Amount of shortening for each formula was a multiple of 50 so that it was a simple matter to throw 1, 2, 3 or more 50-lb. blocks into the mixer, then weigh out dry ingredients and add them to the shortening.

As the shortening was not put into the mixer in one big "glob", we found that our ribbon-type mixer, with piano wire between ribbons, mixed the ingredients sufficiently well to give us a uniform finished product.

This solution benefited operations other than in the mixing room. It cut down on floor space required for storing shortening at our plant and inventory of raw materials. It gave us better control over quality, as the supplier sent samples of each shipment to our laboratory well before it was moved into our plant.—*FE Reader.*

Q.—What information do you have on the desirable carry-over of flavors from whey-fed poultry into soups and gravies?

A.—Eating quality of poultry fed corn-soybean-type rations is improved by the addition of milk products (over the range of 1.5 to 5% milk product solids). Improved flavor, we understand, is carried over into soups and gravies. And, it is reported, broths are uniformly cloudy because of better distribution of chicken fat.

More Aid

One solution would be to use the cube-type shortening pack (easy-to-dispose polyethylene liner within corrugated carton).

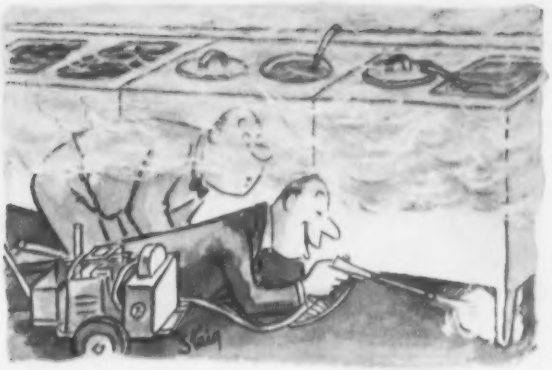
This easy-to-handle pack eliminates waste, shoveling, and pre-heating. And it simplifies storage.—*D. Tucker, Sherman, Tex.*

Roof Needs Repair

Question—Is there any better way of repairing our badly alligatored roof other than applying a cap sheet?

Answer—We know of one treatment by which such a roof can be coated and re-coated without major

J. F. "Sam" Dunne, MILL MANAGER
Farmers' Rice Growers Cooperative
West Sacramento, California



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"The combination of West insecticides, sprays and fumigants, plus the technical training West Representatives have given our men, adds up to facilities that are always clean and assures us of satisfied customers who continue to come back to us year after year for their rice requirements," says J. F. "SAM" DUNNE, Mill Manager, Farmers' Rice Growers Cooperative, West Sacramento, California.

"This is why we have used West materials exclusively since 1950 — both in our old mill, which was a laminated wood structure, and now in our new mill, which is the most up-to-date rice mill in California."

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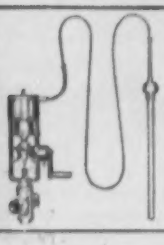

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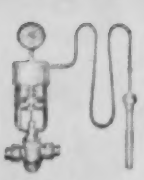
Regulator maintains liquid, air or gas temperature and can also turn valve full-closed or open as specified if bulb or tubing is damaged. Protects equipment and production. Adjustable ranges from 50° to 245° F.

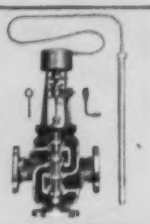
FULTROL PILOT CONTROLLERS

Low-cost pilot modulates air or hydraulic pressure to valves, dampers, other devices. No troublesome pivots or levers. Adjustable 25° F. proportional band. Dial settings. Ranges up to 600° F.



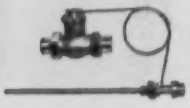
REGULATORS WITH THERMOMETER

Regulator controls temperature . . . thermometer shows it. Dial serves as check on regulator operation. Also permits swift, accurate changes of control setting. Adjustable ranges from 20° to 480° F. Various bulb styles and materials.



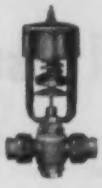
MANUAL OVER-RIDE REGULATORS

Self-powered regulator automatically controls liquid, air or gas temperature. Crank permits manual valve positioning at any time. Provides quick shut-off or full-open operation. Adjustable ranges from 40° to 330° F.



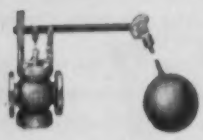
STEAM HEATING REGULATORS

Packless, dial adjusted types control liquid, air or gas temperature by throttling steam 75 psi or below. Calibrated dial on bulb types speeds control settings. Adjustable ranges from 35° to 110° F. Liquid and air type bulbs.



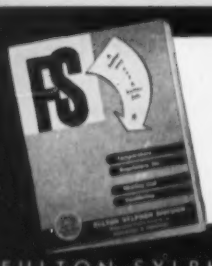
PRESSURE REGULATORS and CONTROL VALVES

Act as pressure reducers, pump governors, relief valves, for constant pressures from 60 to 2 lbs. Vacuum regulators also available.



LIQUID LEVEL CONTROL

Simple, direct-acting float valve controls level of liquids or slurries in open reservoirs. Corrosion-resistant and sturdy. Single-seated or double-seated valves in sizes from ¼" through 4".



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Questions & Answers

repairs. It can be treated with a tough, elastic, rotproof re-inforced coating (supplied by the Philip Carey Mfg. Co., Cincinnati) that presents a new surface to the weather.

Essentially, the coating is a special watertight emulsion, re-inforced with a strong glass fibre mat and topped with another coating of emulsion. The mat bridges alligatored areas and provides a uniform surface for the top coating.

Ketchup Darkens

Question—*We've just started to portion-pack 11g. of ketchup in a cellophane-polyethylene film, and have discovered that some of our initial batches have darkened. We're using ketchup from No. 10 cans, heating it in a steam-jacketed kettle to about 200F. (along with 0.1% sodium benzoate), and filling into packets at about 190F.*

Can you suggest causes of discoloration and steps to take to prevent it for about six months?

Answer—First off, we assume that packets are filled without head-space or air. Otherwise, your ketchup will darken.

Too, you may not be cooling the ketchup sufficiently after packaging. We suggest you immediately air cool to 90F.

It's also possible that you may be storing the packaged ketchup at too high a temperature—perhaps near steam lines or other sources of heat. Warehouse storing should be around 65F.

Re Salami Cotto Formula

Your formulation of the cure used in making Salami Cotto (FE Jan., p. 179) is not quite complete relative to preparation.

To clarify, blend boneless chucks (60 lb.), pork cheek meat (25 lb.), regular pork trimmings (15 lb.), salt (3 lb.), cold water (6 lb.), nonfat milk solids (4¾ lb.), fresh garlic (3 oz.), ground black pepper (7 oz.), and ground cardamon (2 oz.).

Then to prepare the cure, combine:

Sodium nitrate	3 lb. 7 oz.
Sodium nitrite	5 oz.
Dextrose	10 lb.
Water	to make 5 gal.

Use 2¾ lb. of this cure solution per 100 lb. of meats.—*R. J. Remaley, American Dry Milk Institute.*

PROTECTIVE'S

DRUM LINERS • BAGS • CARTON LINERS

. . . all styles, all sizes, produced with fine materials: Polyethylene, Vinyl, Laminates and other flexible films — all at surprisingly LOW PRICES!

*Double-Seal Guaranteed Safety . . .

SUCCESS!

"TWIN-SURE" DOUBLE-SEAL
straight bottom liners

"POWER-SEAL"
round bottom liners

. . originated and manufactured by the pioneers in plastic-liners for steel drums, fibre containers, cartons and boxes . . successfully tested and proven satisfactory for protective packaging by many of America's leading manufacturers, processors and laboratories.

. . . here are just a few users of protective liners:

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GENERAL OFFICES AND PLANT: 22 WOODHULL STREET, BROOKLYN 31, NEW YORK

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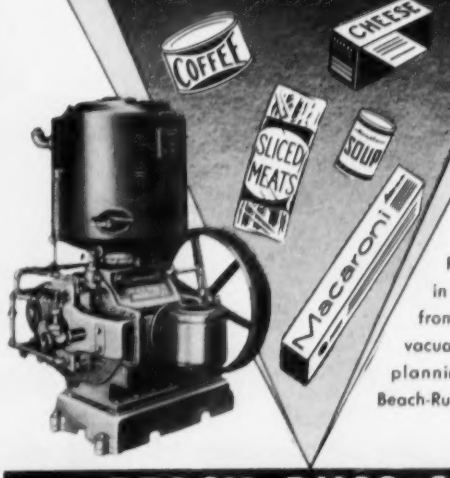
VACUUM *Specialists* **FOR THE FOOD INDUSTRY**



To the consumer "VACUUM PACKED" implies freshness and dependability — vital selling points for all food products — from "soup to nuts." Beach-Russ is a pioneer in aiding food processors and food equipment manufacturers in devising new methods of processing and packaging — of guaranteeing product quality — through the use of vacuum. Beach-Russ Vacuum Pumps are available in types and sizes to meet all needs from 1 to 1800 c.f.m., at high or low vacua. If you need technical advice in planning a new installation, contact Beach-Russ. *Write for Bulletin 89.*

BEACH-RUSS COMPANY

50 CHURCH STREET • NEW YORK 7, N. Y.

Address Department 57

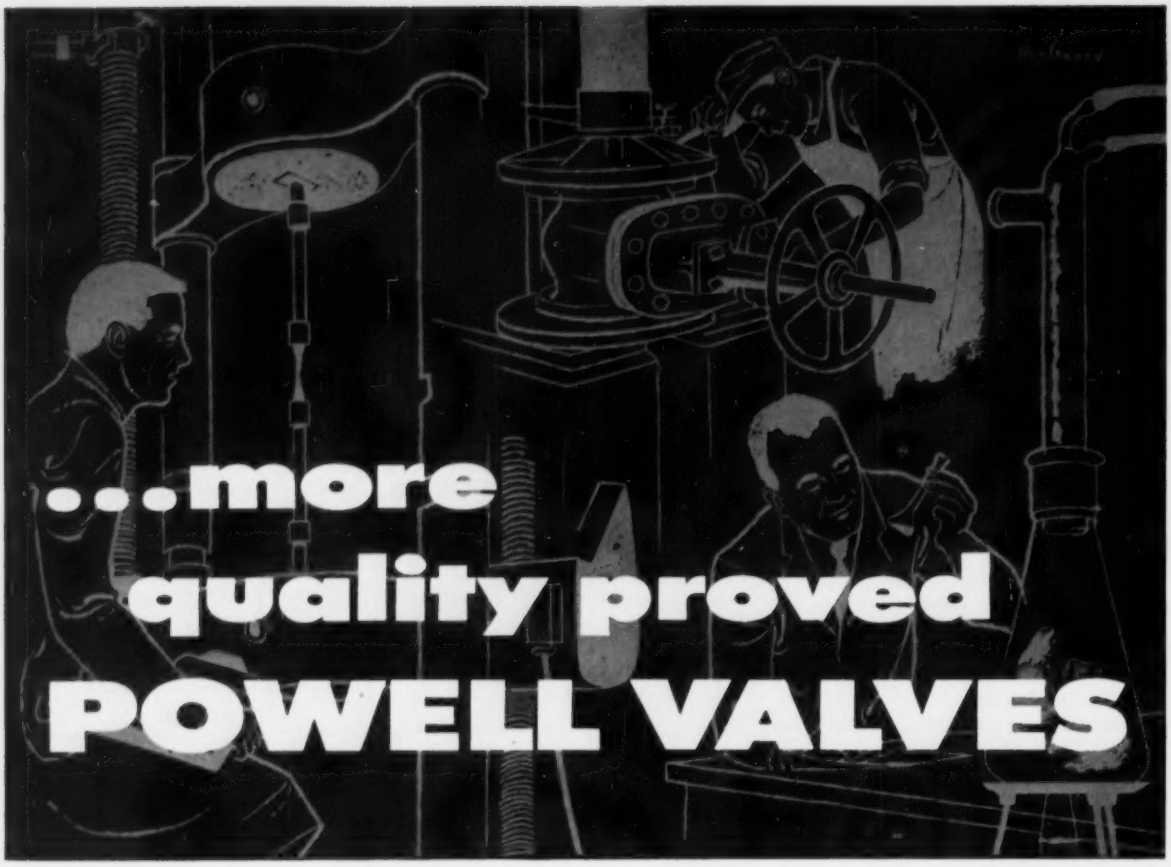
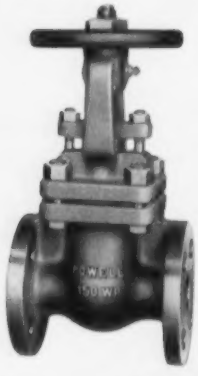


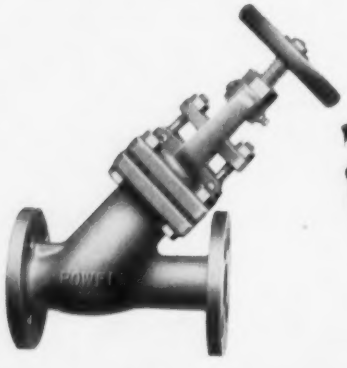
FIG. 2309—Flush Bottom Tank Valve for 150 Pounds W.P.

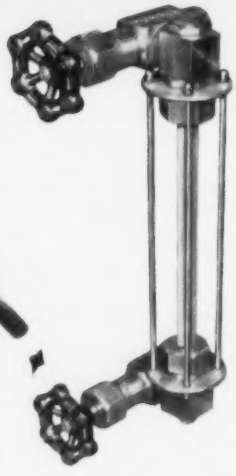
FIG. 2491—Stainless Steel O.S.& Y. Gate Valve for 150 Pounds W.P.

FIG. 1886—Stainless Steel Liquid Level Gauge for 350 Pounds W.W.P. Offset pattern.

FIG. 2107—Stainless Steel "Y" Valve for 150 Pounds W.P.



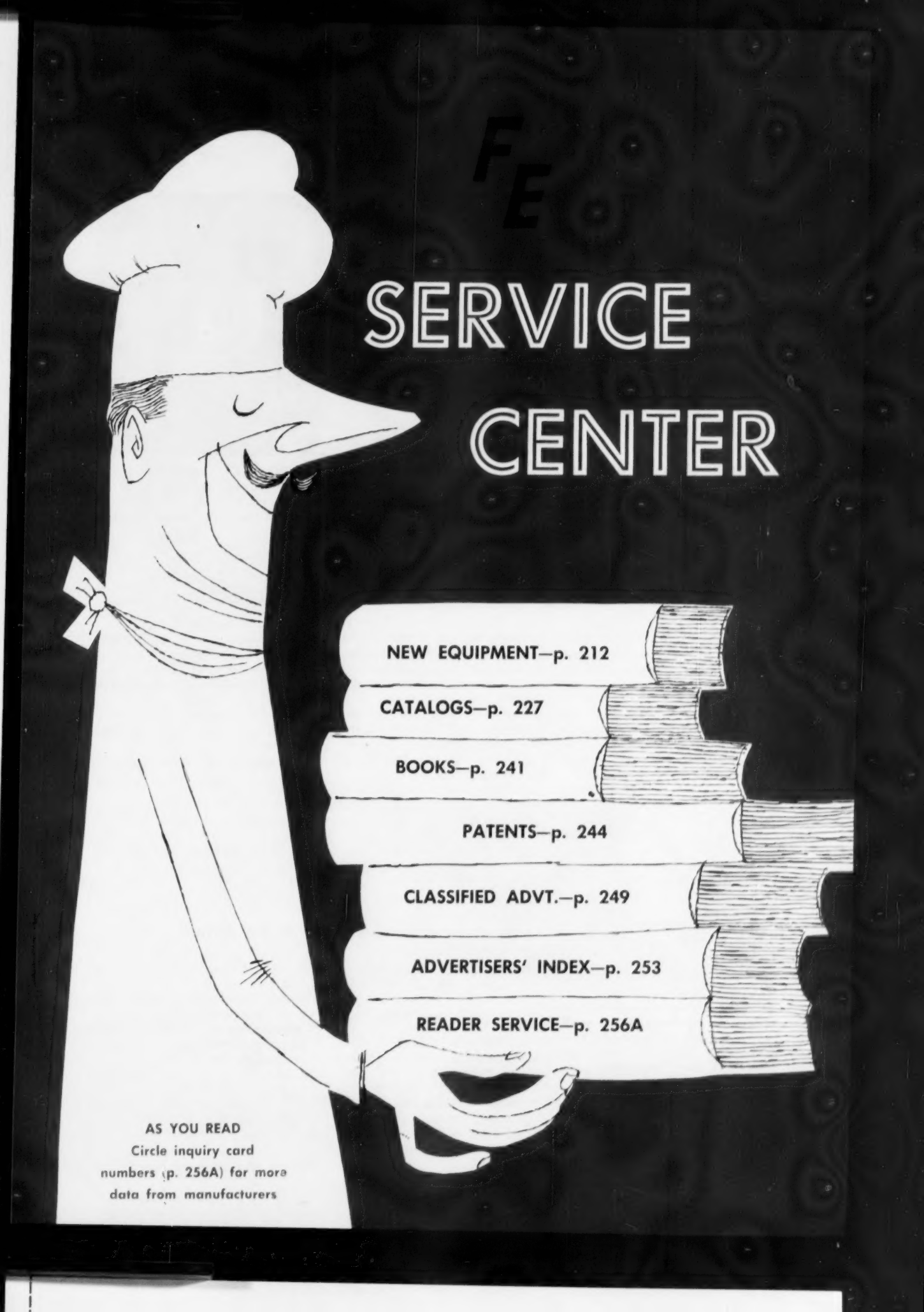




for dependable flow control

Consult your Powell Valve distributor for full facts about quality proved bronze, iron, steel and corrosion-resistant valves. For every flow control problem—there is a Powell Valve to solve it.

THE WM. POWELL COMPANY, CINCINNATI 22, OHIO . . . 111th YEAR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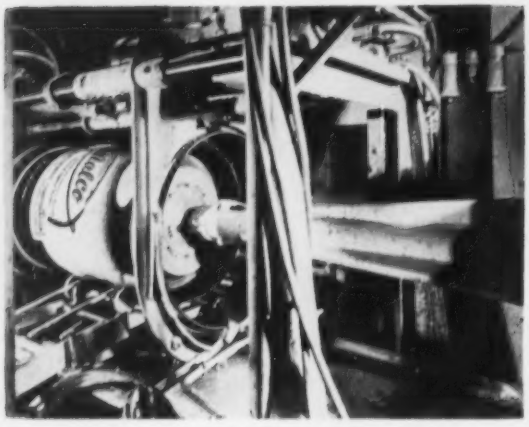
data from manufacturers

NEW EQUIPMENT & SUPPLIES



FOR INNER-COAT UNIFORMITY, this high-speed rotor centrifugally sprays the drum with atomized plastic, material being applied on forward and return strokes of disk. Since drum is stationary, airborne contaminants are not entrained in coating.

NEW CURING TECHNIQUE: After being sprayed, container bodies are placed vertically for oven baking. In this position, each shell acts as a flue, inducing optimum air flow that quickly removes solvents to eliminate porosity and blistering in the lining.

Efficient Drum-Lining Process Ups Product Protection

Here is a new drum-lining technique that promises greater protection for a wider variety of products. Typical plastic lining materials employed are phenolics and vinyls.

A two-part process, it consists first of spraying the inner coat centrifugally, then curing by a new high-temperature process. Primary advantage of centrifugal spraying is uniform distribution of the various lining materials.

Employed in the spraying process is a dynamically-balanced disk that spins at about 3,600 rpm. It casts off a continuous curtain of atomized coating material as a controlled uniform spray. Unit travels through the horizontal container, and material is applied on both forward and return strokes.

Uniform coating enables use of lining materials with substantially lower solvent contents. This, in turn, curbs pinholing and blistering during subsequent curing.

Another advantage of the centrifugal spray is elimination of uncontrolled air turbulence since container body does not rotate. Thus, air is not entrained in the lining material as latter is applied, which therefore excludes airborne dust and greases.

After being sprayed, container bodies are placed on end in an oven to cure the linings (in contrast to conventional baking methods by which drums are placed horizontally). In the vertical position, each drum shell serves as an auxiliary oven flue that introduces a continuous flow of properly controlled heating air across the lining.

Coating solvents are removed rapidly and condensation of volatile resins is prevented.—*Rheem Mfg. Co., 7600 S. Kedzie Ave., Chicago.*

Circle 212A on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard — back of book. Then sign at the bottom and mail. For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

Resistant Lining Laminate Bonds to Any Surface

Offering high resistance to acids, alkalis, and most solvents, this new plastic lining laminate can easily be cemented to any surface (with almost any contour) by semi-skilled personnel.

Known as Kel-F, it is a non-toxic and non-contaminating material with a temperature range of +350 to −100 F. Lining also offers a vapor-permeable and non-sticking surface, highly scuff-resistance and strong.

Typical applications include lining of tanks, drums, pipes, hoppers, and ducts. It may also be used for surfacing of laboratory bench tops, floors, and conveyor belts.

Butt joints are sealed with special tape, and thermal seaming is used in field installations.

Material consists of a thin layer of green-tinted plastic, fused (about half way) into a glass-fabric backing. Latter furnishes a surface readily

bonded to metal, wood, rubber, or plastic, and also permits heat-sealing of seams. Maximum sheet size is 36x42 in., but material is also available in continuous lengths in either 36 or 42 in. widths.—*United States Gasket Co., Camden, N. J.*

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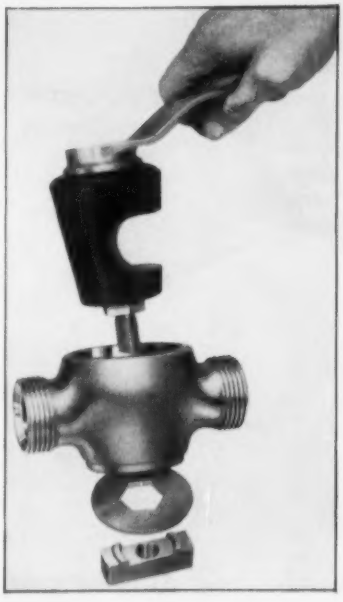

Maintenance Tasks Eased With New Sanitary Valve

Valve maintenance may be greatly simplified with use of this new sanitary unit.

Of stainless steel, valve (UniSeal) employs a rubber-covered cast alloy plug designed to eliminate leakage. It will not gall or score, and is interchangeable to fit any valve of like size. Relation of plug's core size to rubber thickness provides softness for effective sealing, and sufficient firmness to prevent product channeling.

Should valve show signs of wear, operator can quickly install a new plug without removing valve from line, and without machining of seating surfaces. Units are available in 1, 1½, and 2-in. sizes.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago.*

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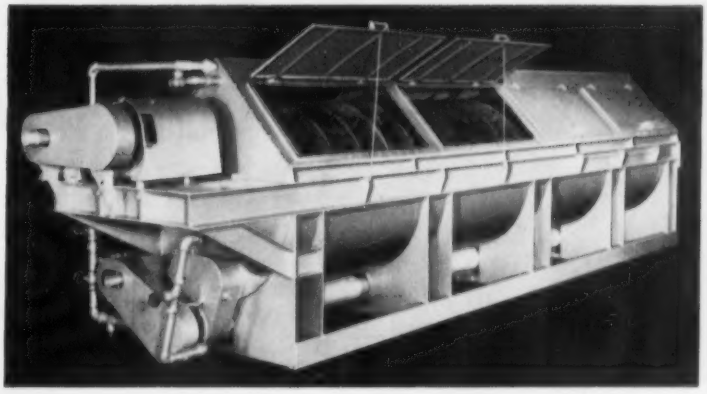

New Sanitary Blancher Offers Gentle Product Handling

Designed to rigid sanitary standards, this vegetable blancher offers thorough cleaning, gentle product handling, and retention of constant water temperature during blanching.

Unit (Sani-Flow) consists of a round-bottom shell and hood combination that houses a perforated spiral screw. Easy access for cleaning, maintenance, and inspection of machine's interior is through large, hinged-door openings on each side of hood section. They also permit hosing residual food particles to an outlet. Contact parts are of stainless.

In operation, product is gently conveyed through the machine by recirculating water, which eliminates crushing or tumbling action. The spiral screw, which revolves at a predetermined speed, is used as a timer to control product's floating action for proper blanching time and continuous discharge. Close tolerance between screw and shell walls prevents product channeling.

Constant water temperature is maintained by steam jets that feed into the shell and recirculating tube.—*Food Machinery and Chemical Corp., Canning Machinery Div., P. O. Box 1120, San Jose, Calif., or 103 E. Maple St., Hoopeston, Ill.*

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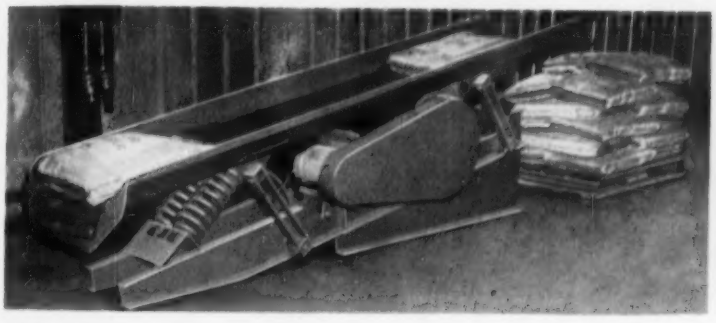


Vibrating Unit Gently Flattens 150 Bags per Hr.

Moving upward along this vibrating conveyor, bags are flattened by gentle tossing action (note difference in bag shape at feed and discharge ends.) Powered by ¼ hp. motor, unit (Natural Frequency) is termed particularly adaptable to fragile items, such as spray-dried materials, since it eliminates product breakdown—*Carrier Conveyor Corp., 198 N. Jackson St., Louisville, Ky.*

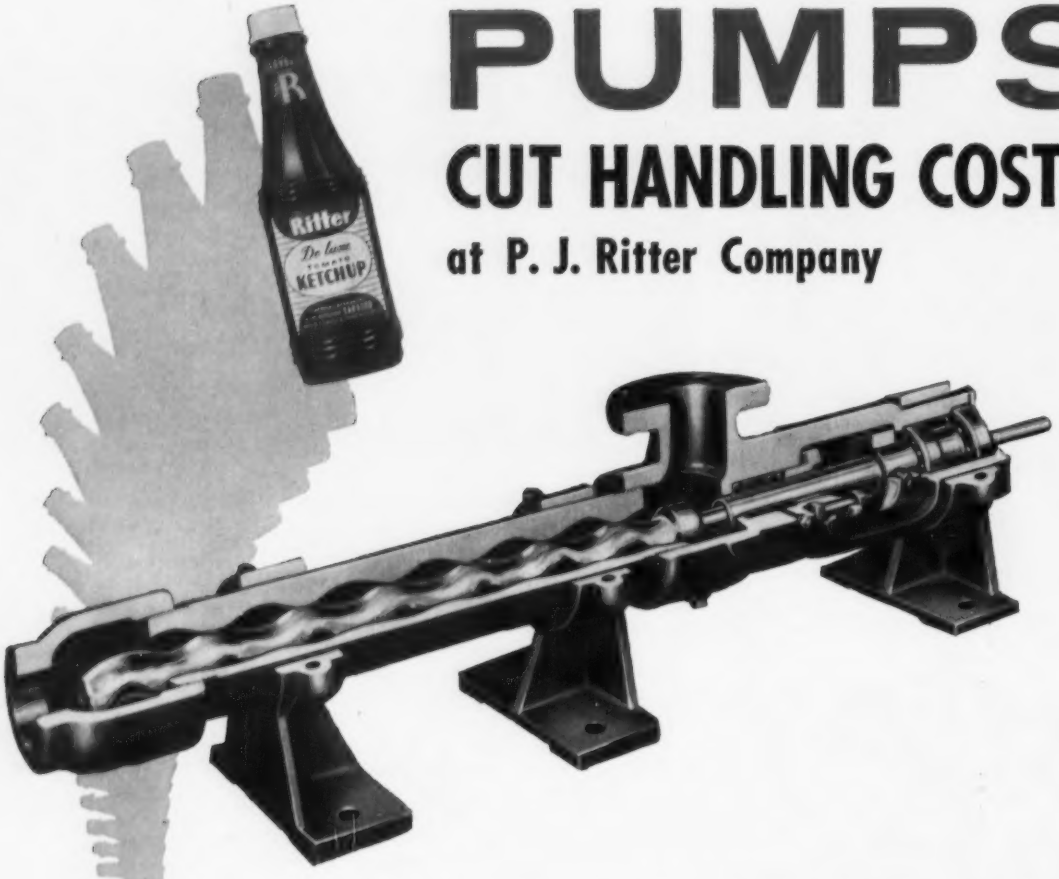
Circle 213C on Reader Service Card

TEAR OUT AND FILE

MOYNO® PUMPS

CUT HANDLING COSTS

at P. J. Ritter Company



...pumping tomato seeds and 5-15% water

The Moyno "progressive cavity" pumping principle has enabled thousands of plants to pipe difficult materials that were transported by hand and other expensive means. For example, The P. J. Ritter Co., famous food packers since 1854, have increased efficiency by installing seventeen Moyno Pumps. The one shown at the left is pumping tomato seeds in 5-15% solution at 10 gallons per minute. The pump runs at 600 RPM.

Moyno is the only pump that will handle many difficult materials such as abrasives, pastes, slurries, chemicals, foods, suspended solids, etc., without foaming, aerating, crushing or excessive pump wear.

Examine your processing methods. No doubt there are several places where Moyno Pumps can drastically cut costs. Ask us, we'll give you a prompt answer. Send us an outline of your problem today! Write for Bulletin 30-FE.

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ROBBINS & MYERS, INC.

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Motors | Fans | Hoists | Moyno® Pumps | Propellair® (Industrial) Fans

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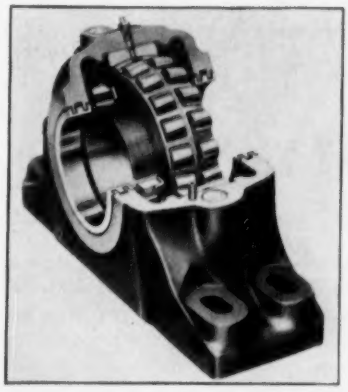

New Pillow Block Permits Fast, Accurate Mounting

Ease of installation and maintenance is cited for a new line of spherical roller-bearing pillow blocks employing a novel mounting technique.

Unit (Spher-Align) enables quick and easy seating of bearings through use of set screws. Latter are located in an adapter nut and run parallel to the bore. After bearing is snugged up with adapter nut, adjustment is completed by turning screws (Micro-Mount) against locking washer until bearing, adapter, and shaft form an integral unit.

The compact housing is built of special semi-steel to withstand shock loads. It also allows lubricant to enter at center of bearing and move outwardly along all bearing surfaces. Convenient drain plugs permit use of either grease or oil, and provide for easy flushing. Triple seals retain the lubricant. Dimensions of these units are standardized for interchangeability with other similar blocks.

Units are available in both expansion and non-expansion types in sizes to fit shafts 2 7/16-8 in. dia.—*Dodge Mfg. Corp., Mishawaka, Ind.*

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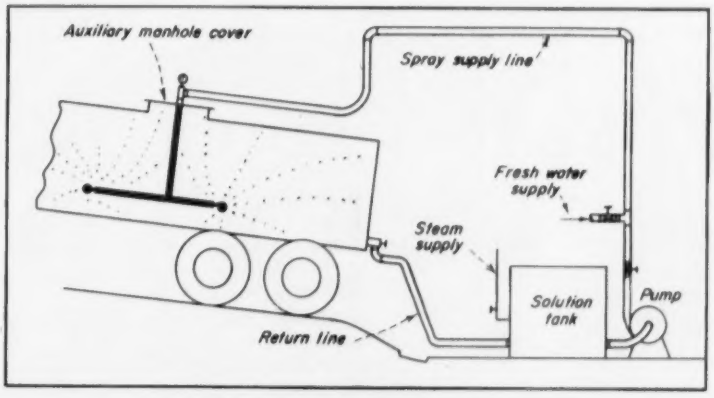


Portable Spray Unit Speeds Tanker Sanitation

Interiors of milk-transport tanks may now be cleaned in as little as 15 min. with use of a new spray unit that eliminates any chance of human error.

Called Transpray, it consists of a stainless steel "T" with fixed spray heads at either end of a cross bar that fits inside a tank. Spray heads simultaneously direct cleaning solution to every part of the interior, thus there is no need for an operator to enter a tank, either before or after cleaning.

In operation (see diagram), solution is pumped from a storage tank through a supply line to the portable spray. During cleaning, an auxiliary manhole cover holds unit in place to prevent escape of solution. Latter is returned to storage tank for reuse, and a steam line keeps it at proper temperature.

The "T" has no moving parts, which minimizes maintenance. Sprays are available in two standard sizes, but can also be made to specifications.—*The Diversey Corp., 1820 W. Roscoe St., Chicago.*

Circle 215B on Reader Service Card

Versatile Recorder Offers In-Line Viscosity Control

Designed for continuous consistency measurement of fibrous or pulpy slurries, this recorder permits automatic control of products as heavy as ketchup or applesauce.

Unit (Plastometer) consists of a simple hydraulic "flow-bridge," insensitive to flow-rate fluctuation. Consistency is recorded in arbitrary units that can readily be correlated with those of Adams or Bostwick consistometers.

Instrument's wide range can be changed without special tools or attachments, and unit can readily be disassembled for cleaning.—*Fischer & Porter Co., 11 Jacksonville Rd., Hatboro, Pa.*

Circle 215C on Reader Serice Card

New Pushbutton pH Meter Is Versatile Q.C. Unit

This automatic pH meter, with drift-free amplifier, can be adapted for potentiometer-recorder output, automatic temperature compensation, and Karl Fischer titrations.

Better, Cheaper Drying

with Taylor in control at New Mill Noodle and Macaroni Co.

CASE HARDENING, and resultant cracking or checking, is no problem for New Mill Noodle and Macaroni Co., Chicago, Illinois. Drying is much more reliable and no operator attention is required.

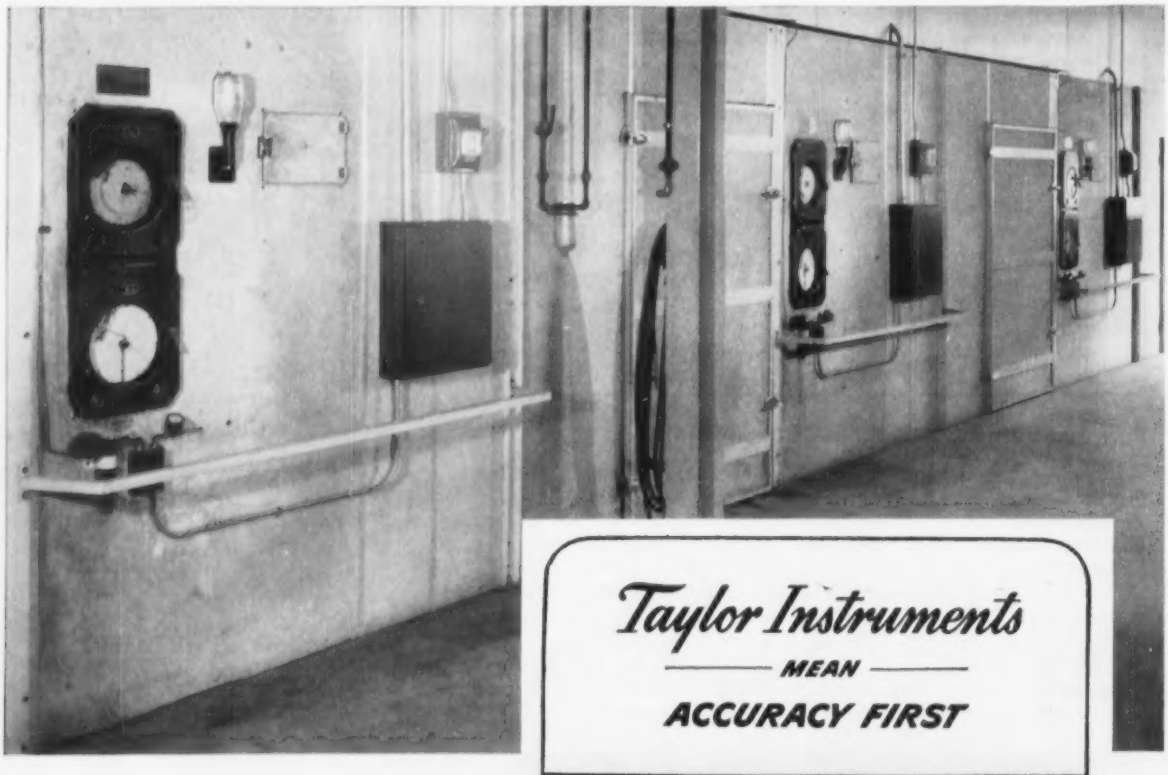
The secret is the use of a modern dryer, designed by the Glenn G. Hoskins Co., Libertyville, Ill., and an accurate wet and dry bulb temperature-humidity control system supplied by Taylor Instrument Companies. The Taylor system utilizes a FULSCOPE* Time Schedule Controller, which automatically controls both dry and wet bulb temperatures *with an accuracy within* ½°F. according to a pre-determined schedule. An "interrupter-timer" adjusts total length of the drying schedule from a minimum of 12 hours to an infinite time.

A time-schedule controller is desirable for batch drying operations, since it is necessary to start the drying with a low depression (high humidity), or small difference between dry and wet bulb readings. Drying then proceeds at stages determined by the instrument cam schedules, to the point where the depression is quite large, and drives the finished moisture of the product down to the required level of 10 to 11½%.

This system saves money for New Mill in two ways. **1.** It insures a uniformly dried product. **2.** It reduces operator attention time very considerably—for instance, a night crew is unnecessary.

Consult your Taylor Field Engineer for full details about this and other cost-cutting Taylor systems. Or write for information to Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

*Reg. U.S. Pat. Off.



Taylor Instruments
MEAN
ACCURACY FIRST
VISION · INGENUITY · DEPENDABILITY

Known as Zeromatic, it has a 0-14 pH scale and two millivolt ranges: 700-0-700 mv. and an extended 0-1400 mv. range, the latter being particularly useful for oxidation-reduction titrations. "Zero" can be set at any point on the 0-1400 mv. scale.

Reading error is minimized by mirror-backed scales that eliminate parallax. Readings are accurate to 0.1 pH unit and reproducible to 0.02 pH. In addition, unit employs a "standby" circuit that eliminates warmup.

Instrument is ready to operate at the touch of a button, since it is connected to a 115-v. power source at all times. Pushbuttons also control temperature compensation (manual or automatic) and selection of millivolt range. — *Scientific Instruments Div., Beckman Instruments, Inc., 2500 Fullerton Rd., Fullerton, Calif.*

Circle 215D on Reader Service Card

Automotive Lube Oil Cuts Engine Wear

Here's a new lubricating oil specially designed for engines of multi-stop delivery trucks.

Called Traffic Motor Oil S-1, it is said to cut engine wear and oil consumption, also keeps engine cleaner. A combination of special-base oil and additives, it curbs formation of heavy sludge developed in stop-and-go service, also varnish and rust.—*Gulf Oil Corp., 1822 Gulf Bldg., Pittsburgh.*

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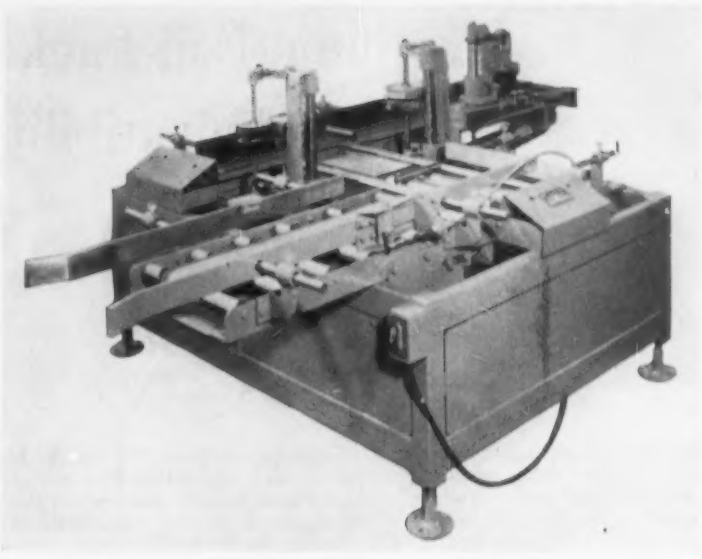


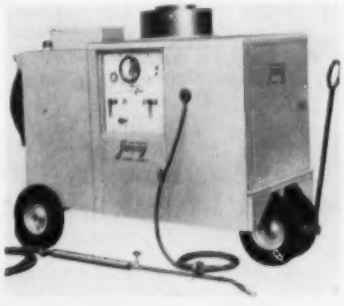
Versatile Case Imprinter Marks All Four Sides

To enable ready identification of cases in warehouses, this automatic unit imprints name, contents, and product serial number on all sides of a carton.

Requiring no manual positioning of cases, it prints on two panels and two ends. Printing range is 11 in. high, which accommodates from 1-8 lines.

The type may be graduated from ¼-1½ in. high, and serial-numbering device prints 6 digits in figures up to 1½ in. high.—*J. L. Ferguson Co., Joliet, Ill.*

Circle 217B on Reader Service Card



Portable Steam Cleaner Eases Plant Sanitation

Instant choice of various types of cleaning action is cited as a prime advantage of this new high-pressure cleaner.

By simply setting valves on unit's control panel, operator can get up to 400 gph. of hot or cold cleaning solution at pressures up to 450 psi. Cleaner (Series 4000) delivers a mixture of steam, water, and cleaning compound at 325 F., or clear cold water alone. This versatility permits handling of such diversified jobs as blasting heavy deposits from trucks, and removing grease and dirt from equipment, walls, and floors.

Unit is available in portable or stationary models with either electric motor or gasoline-engine-driven pump, and choice of oil or gas fuel. —*Homestead Valve Mfg. Co., Coraopolis, Pa.*

Circle 217C on Reader Service Card

Greater Absorbency Cited For New Paper Towel

Seen cutting washroom-maintenance costs is a new high-absorbency paper towel.

Known as UHA No. 151, it consists of two plies embossed and

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Aluminum Foil Packaging– Versatility and Compatibility Unexcelled

Report No. 8 of a Series by Reynolds Metals Company

Aluminum foil packaging has the advantage over most other industries in the extraordinary degree to which it can benefit from technological advances in widely varying fields.

This is due primarily to the innumerable combinations of foil with other materials. There have been many improvements in aluminum foil itself since its packaging inception. But its basic physical properties remain constant—and unexcelled. The great advances have been made in the coupling of these unique aluminum foil properties with the strong points of the newest developments in papers, films, resins, waxes, surface treatments and cloths. By such combinations, laminated or coated, flexible packaging moves forward steadily and often spectacularly.

In reviewing the materials section of a packaging encyclopedia, it would be difficult to find a material which has not been combined with aluminum foil at one time or another. A similar review of a plastics encyclopedia would reveal a myriad of raw materials used in foil converting. The accompanying chart tabulates a few of the raw materials more commonly used in conjunction with aluminum foil. Such a wide selection of raw materials presents infinite possibilities in production of aluminum foil packaging.

Technological advances in the chemical industry aside from packaging materials have also aided in the advance of aluminum foil packaging. Developments such as antimycotics, fungicides, antioxidants, and volatile corrosion inhibitors—instead of supplanting aluminum foil have actually expanded applications of foil packaging.

Scientific progress in other fields reflects an increased need for aluminum foil packaging—particularly the development of new products and processes by the food industry. Economical marketing of such products as gas-packed potato powder, ready-to-bake hams, and oven-ready biscuits is made possible by aluminum foil packaging.

The trend toward convenience features in food packaging has found a willing ally in versatile aluminum foil. Rigid, pure aluminum foil containers of many types, shapes and sizes are used to carry foods through the entire cycle from farm to table—cooking, freezing, shipping, retail selling, heating in the home oven, and serving. Other containers are included in prepared cake and bread mix packages to be used as baking pans. And laminated foil combinations are used for bags or pouches which are simply immersed in boiling water to cook or heat the contents.

Looking into the future and the atomic age, aluminum foil is expected to play an ever increasing role. Development of radiation sterilization and pasteurization will undoubtedly bring forth new developments in aluminum foil packaging.

Keeping abreast of new developments and evaluating new products is an important phase of Reynolds continuous research program. As a pioneer in the aluminum foil packaging field, the Reynolds Metals Company can draw upon a wealth of experience in solving individual packaging problems as well as in developing a complete line of products created by technological advances. If your problem is packaging, your Reynolds regional representative will be happy to recommend the proper aluminum foil combination. Or write to **Reynolds Metals Company,** General Sales Office, Louisville 1, Ky.

MATERIALS COMMONLY COMBINED WITH ALUMINUM FOIL

FILMS
- Cellophanes
- Cellulose Acetates
- Cellulose Acetate Butyrates
- Mylars
- Pliofilms
- Polyethylenes
- Sarans
- Vinyls

PAPERS & BOARDS
- Bonds
- Bristol Boards
- Chipboards
- Corrugated Boards
- Glassines
- Greaseproofs
- Krafts
- Manilas
- Newsboards
- Parchments
- Pouch Papers
- Tissues

COATINGS & INKS
- Ethyl Celluloses
- Methacrylates
- Nitrocelluloses
- Polyamides
- Vinyls
- Phenolics

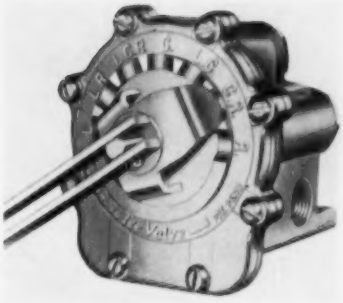
CLOTHS
- Scrims
- Nylons
- Glass
- Nonwoven Fabrics

©Reynolds Metals Company, Louisville, Kentucky

welded to produce a contoured surface with many tiny pockets. These small spaces provide greater bulk and surface for absorbing liquids, thus one towel generally suffices to dry both hands and face.

In addition, towels are chemically treated for increased wet strength, which permits wiping or rubbing without tearing or shredding. They measure 10⅞x14 in., and are packaged 150 to a board sleeve, 25 cartons to a case.—*Scott Paper Co., Chester, Pa.*

Circle 217D on Reader Service Card



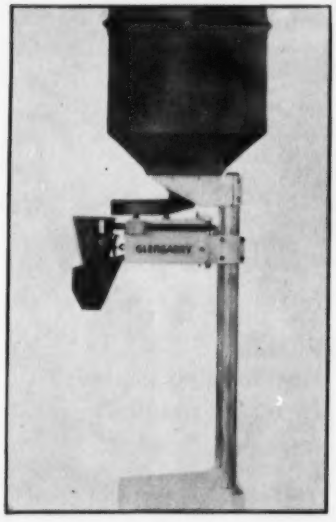
Flexible Control Provided By 4-Way Selector Valve

Designed for accurate control of liquids flowing to multiple spray manifolds or feed lines, this four-way selector valve permit flow through any one or a combination of three outlets.

Settings are indexed for exact positioning of a control lever, selection being made with valve (TeeValve) in "off" position. Just raising the lever handle opens the valve. Units are available with ¼-, ⅜-, and ½-in. NPT outlet connections.

Also provided are connections for pressure gage and bypass, and pressure relief valve assembly, thus unit is termed suitable for all pump systems. Made of aluminum and stainless steel, valves have precision poppet-valve assemblies, stainless springs, and nylon seats. Latter are quickly replaced by removing outlet adapters.—*Spraying Systems Co., 3212 Randolph St., Bellwood, Ill.*

Circle 219B on Reader Service Card



Weigher Can Be Washed Since Parts Are Sealed

Entire mechanism of this automatic weigher is sealed in a cast-aluminum enclosure, thus it can be easily washed. Furthermore, all contact parts are of stainless steel.

Unit (Model B) handles a wide variety of dry products over a range of 1 oz. to 10 lb. Capable of up to 30 weighings per min, it also lends itself to automatic batching with a series of machines.

Controls are remotely housed and electrical contact is made by watertight connectors. Units are available in single and two-station models mounted on sanitary and easily adjustable pedal-type supports.—*Glengarry Processes, Inc., Bay Shore, N. Y.*

Circle 219A on Reader Service Card

INGREDIENTS

Report Triple Advantages Of Versatile Meat Binder

Prepared from a baked crumb loaf, and free of shortening, this binder for sausage and meat loaf offers controlled cold and cooked absorption, low bacteria count, and a baked-crumb flavor.

Designated Krusto-"S," it is available in two forms: Coarse crum for meat loaves, and fine crumbs for fresh sausage. Coarse product has slightly slower absorption than the fine, but both provide advantageous "double-action."

In meat loaves, first action is ample initial absorption so that loaves firm up, mold well, and cook without excessive moisture loss. Then as they cool, binder absorbs surface juices. Second absorption occurs when loaves are heated by consumer, thus crumbs hold juices and fats that otherwise would cook away.

In sausage, fine crumbs absorb juices and moisture to firm up the product in the mixer, also during stuffing, linking, and packaging. Where sausage is packed directly off table, this binder helps to minimize drip.—*Griffith Laboratories, Inc., 1415 W. 37th St., Chicago.*

Circle 219C on Reader Service Card

Sausage-Processing Time Cut by New Starter

A dry lactic-acid starter culture, for production of dry sausage, is said to cut processing time 50-60% and virtually eliminate product failures.

Called "Accel" it is a formulation of *Pediococcus cerevisiae*, which converts dextrose to lactic acid. Latter is primarily responsible for tangy flavor of fermented sausage. Added to freshly-ground sausage, cultures rapidly produce uniform quantities of acid, and eliminate reliance on chance innoculation.

Meat Inspection Branch (USDA) approves use of this starter in summer sausage, Lebanon bologna, thuringer, cervalat, salami, and pork roll.—*Merck & Co., Chemical Div., Rahway, N. J.*

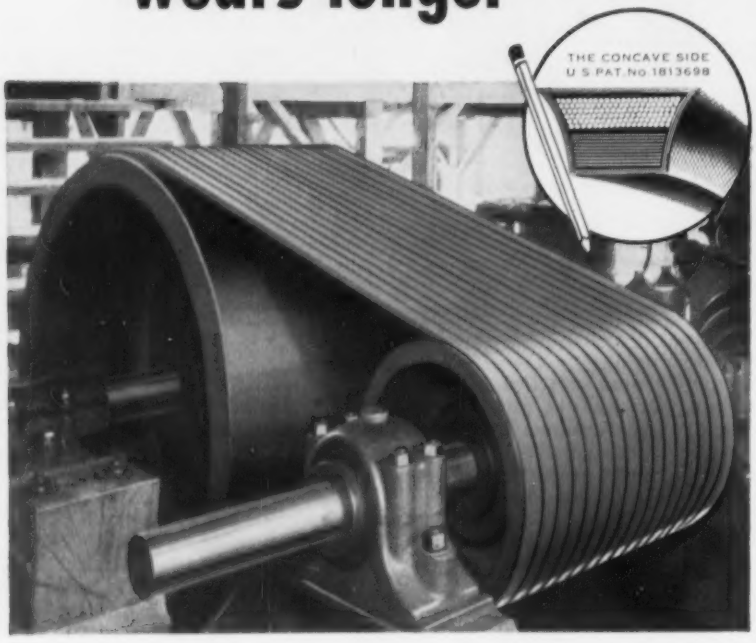
Circle 219D on Reader Service Card

Nutmeg Closely Simulated By Synthetic Product

Cost of flavoring with ground nutmeg may now be substantially cut with use of a new imitation spice whose flavor, texture, and aroma reportedly are very close to their natural counterparts.

Developed for use in premixes and baked goods, product consists of a compatible base that is fortified with a mixture of natural and synthetic oils of nutmeg. Material looks and

Why a V-Belt with CONCAVE SIDES wears longer



It is easy to demonstrate to yourself why the concave sides (Fig. 1) of the Gates belt greatly lengthen belt life.

Simply bend a Gates belt and feel the sides. Notice how these precisely engineered concave sides *fill out* on the bend and *become straight*. Thus a Gates belt grips the sheave groove evenly (Fig. 1-A) and wear is distributed uniformly across each side of the belt. That means longer belt life; lower costs.

Make the same test with a straight-sided belt (Fig. 2) and see what happens. The sides bulge out on the bend (Fig. 2-A) concentrating the wear at points shown by arrows.

To assure longer wear and keep belt costs down, specify the V-belt with Concave sides—Gates Vulco Rope . . . readily available from nearby distributor stocks. The Gates Rubber Company, Denver, Colorado—*World's Largest Maker of V-Belts.*

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 90

Gates VULCO ROPE Drives

New Equipment & Supplies

acts like natural nutmeg, and its flavor does not bake out.

Product is available in 100- and 280-lb. fiberboard drums, or in other standard quantities.—*Knickerbocker Mills Co., 601 W. 26th St., New York City.*

Circle 219E on Reader Service Card

CHEMICALS

Floor-Surfacing Material Has Sanitizing Effect

Easily applied, this patching compound for new or old concrete floors is designed for heavy traffic. Furthermore, it contains an anti-bacterial ingredient that aids plant sanitation.

Product (Super-Patch) hardens to give concrete compressive strength of up to 10,000 psi., also resists corrosion by oils, greases, acids, and strong cleaning compounds. Shipped as a dry powder, material is available in a variety of colors.—*Maintenance Engineering Co., 16 W. Johnson St., Philadelphia.*

Circle 220A on Reader Service Card

Hog-Scalding Improved By New Formulation

Designed to ease hair removal in hog-scalding, this single-package material is said to minimize subsequent singeing, scraping, and shaving, and to lessen danger of skin damage.

Known as Scald-Aid, it is used in concentrations of 15-20 lb. per 1,000 gal. of water, at temperatures of 138-140F. No lime or other additive is necessary.—*Oakite Products, Inc., 19 Rector St., New York City.*

Circle 220B on Reader Service Card

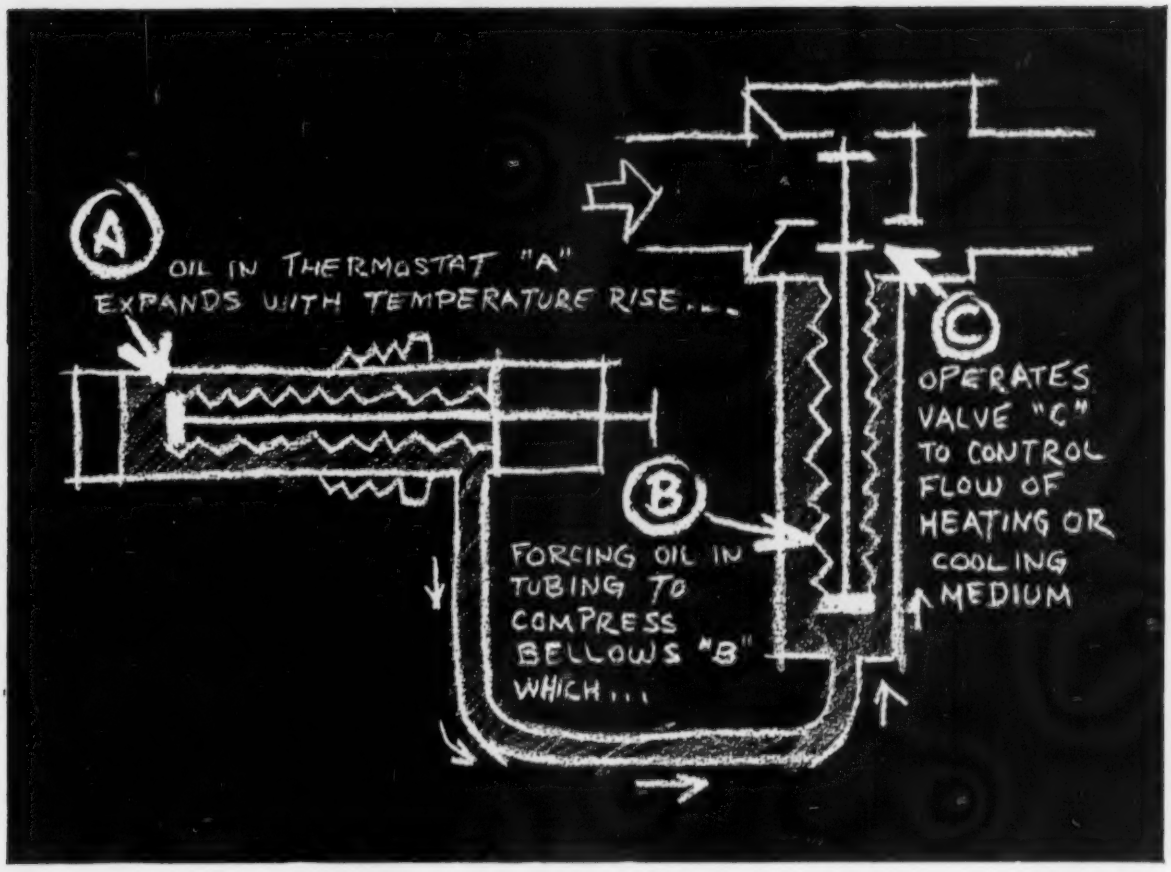
Crawling Insects Curbed By Odorless Coating

A new insecticide promises season-long protection from crawling insects.

Designated No-Roach, it is a colorless liquid that quickly dries to form an invisible, odorless coating. Material is termed particularly effective against weevil damage to macaroni products.—*Gaston Johnston Corp., 24-64 45th St., Long Island City, N. Y.*

Circle 220C on Reader Service Card

← For more data, circle this page number on card at back


A
OIL IN THERMOSTAT "A" EXPANDS WITH TEMPERATURE RISE...
B
FORCING OIL IN TUBING TO COMPRESS BELLOWS "B" WHICH...
C
OPERATES VALVE "C" TO CONTROL FLOW OF HEATING OR COOLING MEDIUM

Automatic Temperature Control

AS SIMPLE AS A-B-C !

And what could be simpler!

Just take another look at that rough sketch. That's all there is to it. A simple thermostat – a length of tubing – a valve. That's all!

That's the trouble-free design of the Sarco SELF-POWERED temperature control. And each year, thousands give accurate service in all industries ...for firms such as Colgate-Palmolive Company, Sinclair Refining Company, Swift & Company.

These temperature controls are simple, inexpensive, dependable, effective. No highfalutin gadgets that take a technician to read and a specialist to fix! Self-contained–no exposed mechanism. Packless. No outside power connections. Can be installed by any pipe-fitter.

And you'll find these temperature controls wonderful for about 85% of your jobs...all but those few specials that call for elaborate, costly control.

Cost? Mighty low! For example, the ½" size is yours for about $100. It's good economy to specify AUTOMATIC temperature control for ALL control jobs, not just the big ones.

SARCO COMPANY, INC.

Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

Please send information on your simple, inexpensive temperature controllers:

☐ Self-powered type for use on_____

☐ Electric indicating type for use on_____

Name_____

Firm_____

Address_____

City_____ State_____

21369

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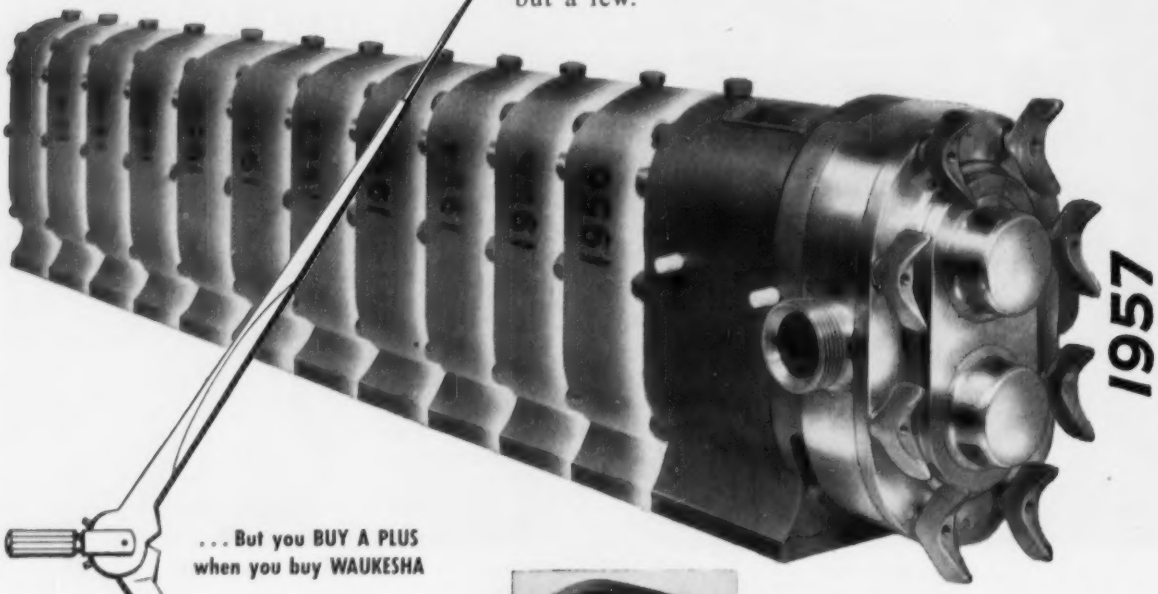
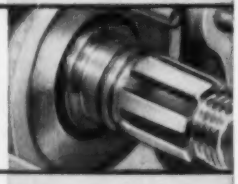
You Buy the DEPENDABILITY of a Quarter Century's Experience in WAUKESHA P. D.* Sanitary Pumps

● WAUKESHA today offers you the most Sanitary pump with the highest industry-proved performance of any in the field. Only WAUKESHA forges ahead with 18 new and important features. Heavier shaft construction . . . the Twin O-Ring Seal that positively prevents product leakage or intake of air . . . new reversible, stainless steel sleeve to save shaft wear . . . force-feed lubrication of heavy duty ball bearings are but a few.

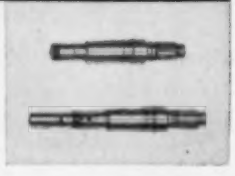


. . . But you BUY A PLUS when you buy WAUKESHA

NEW! Reusable pump head gasket provides absolute seal at all vacuums, eliminates costly, troublesome paper gaskets.



Shaft sleeve seal O-Ring is located below the stainless steel sleeve, assures exact, precision positioning of the impeller.



Shafts of larger diameter with more and huskier splines provide flex-free operation and rigidity of the impellers.

* Positive Displacement

You are buying a quarter century of top engineering experience from the pioneer of the Sanitary Positive Pump. During that quarter century WAUKESHA has developed and pioneered every important improvement. Those are vital reasons why "Waukesha Is Another Word For Dependability."

All 18 new features of the WAUKESHA Sanitary Pump are completely described in this 1957 Catalog. Send a postcard requesting it — Today.

ONLY Waukesha gives you a quarter century's experience and reliability

Waukesha FOUNDRY COMPANY

Dept. No. A-4 WAUKESHA, WISCONSIN

BRIEFS . . .

Automatic Coder, with 'no-lid–no stamp' device, prints ice cream flavors or multiple digits on any type of lid surface. Type and ink pad can be instantly changed without tools.—*Lily-Tulip Cup Corp., 122 E. 42 St., New York City.* (223A)

Embossed Panel Coils, made by welding two metal sheets, cut cost of adapting equipment, such as mixers and screw conveyors, for heating or cooling. Jointed construction permits fabrication to any size or shape.—*Dean Products, Inc., 616 Franklin Ave., Brooklyn, N. Y.* (223B)

Triple-Effect Evaporator, of Italian design, concentrates about 15,000 lb. per hr. of tomato juice from 6-32% solids, also produces some 12,000 lb. per hr. of 44% paste. Feed is pasteurized for 15 min. at 185F. in stainless unit's first effect, then concentrated at 108-115F. to protect flavor and color.—*Tito Manzini & Figli, Parma, Italy.* (223C)

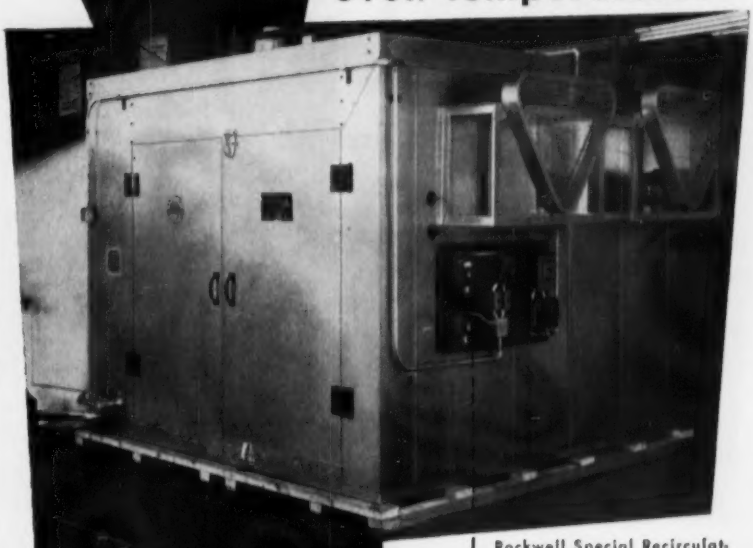
New Vacuum Capper, for ice-cream and cottage-cheese fillers (Anderson), employs pick-off arm, vacuum pump and motor, and cap-chute assembly. Automatic device (Push-Thru) handles up to 45 cups per min., applying either paper or plastic "snap-on" coverall lids.—*Anderson Bros. Mfg. Co., 1907 Kishwaukee St., Rockford, Ill.* (223D)

Sanitary Ball-Transfer Unit, consisting of cup retainer for 1-in. steel ball, resists corrosion and needs no lubrication. Open at bottom, unit (Nylo) permits foreign matter to drop out, and ball can easily be removed from cup (without tools) for total cleaning.—*Metzgar Conveyor Co., 412 Douglas St. N. W., Grand Rapids, Mich.* (223E)

Special Patty Paper is strip-laminated and coated to prevent sticking to frozen meats. Sheets are available in various sizes for mechanical and hand packing.—*Mid-West Wax Paper Co., Fort Madison, Iowa* (223F)

Efficient Drum Heater speeds removal of viscous materials from standard 55-gal. drums. Device (RH-1 Acrawatt) has quick-action toggle clamp and 3-heat wiring circuits for uniform heating at any of three switch settings.—*Acra Electric Corp., 9909 Pacific Ave., Franklin Park, Ill.* (223G)

w. s. rockwell company depends on partlow controls for accurate oven temperatures



Rockwell Special Recirculating Truck Oven for indirect gas heating to 500°F. . . . with Partlow M2 Electric Indicating Control, and 02 Limit Control.

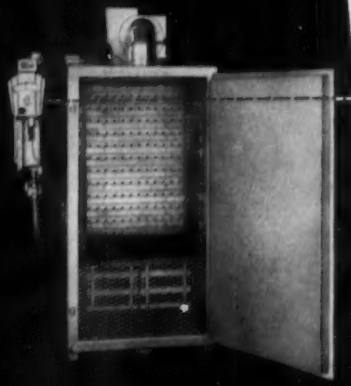
partlow

Rockwell Standard Bench Oven with Partlow M2 Electric Indicating Control . . . range 50° to 350°F.

W. S. Rockwell Co., Fairfield, Conn., one of the oldest builders of industrial ovens, specifies Partlow Controls to insure the high standard of performance for which their ovens are famous.

There's a Partlow control . . . in the –30°F. to 1200°F. range . . . for use on your own product or in your manufacturing operations.

Available for use with gas, oil, steam or water valves; or electrical equipment.



Rockwell Recirculating Bench Oven with Partlow IVS explosion-proof Indicating Electric Control . . . range 100° to 350°F.

partlow

the pioneer in mercury thermal controls

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LUBRIPLATE No. 630-AA LUBRICATES ABOUT EVERYTHING

LUBRIPLATE No. 630-AA is practically a universal grease type lubricant. It was developed to meet industries' need for *"simplified lubrication"* . . . one lubricant to effectively satisfy a great number of requirements. LUBRIPLATE No. 630-AA has a smooth, stable consistency, a wide temperature range, possesses high film strength, fine adhesive properties and is water repellent. It satisfies most lubrication requirements, thus eliminates the need for a different lubricant for each application in many cases.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for free "LUBRIPLATE DATA BOOK". . . a valuable treatise on lubrication. LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J. or Toledo 5, Ohio.

EQUIPMENT APPLICATIONS

Process Water Tempered By Thermostatic Unit

Automatic control of water temperature used in processing of poultry at George I. Petit Co., Doylestown, Ohio, has eliminated torn chicken skins and employee hand pains, both caused by former use of 57-F. well water.

Now, thermostatic units (Type H Hydroguards, Powers Regulator Co., 3434 Oakton St., Skokie, Ill.) provide 90-F. tempered water for washing and rinsing. As a result, 12 women on the eviscerating line turn out 1,920 processed birds per hr., a job that calls for nimble fingers.

Company also uses this tempered water to spray chickens as they pass through automatic picking machines, the warm water preventing the skins from contracting and tearing.

To furnish the 90-F. water, cold water at 57-F. is mixed with 180-F. boiler water. Controllers automatically compensate for variations in supply-water temperatures or pressures, and mixing units can be adjusted to deliver water at any temperature from 65-110 F.

Circle 224A on Reader Service Card

Conveyors Mechanize Ripening of Bananas

Special overhead conveyors provide in-process storage for bananas while they are being ripened at the Boston warehouse of Stop & Shop, Inc.

When the fruit is ripe, this conveyor system (Coburn, Wickwire-Spencer Steel Div., 575 Madison Ave., New York City) carries it to a shipping room for delivery to the company's supermarkets.

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STEEL

Every Kind

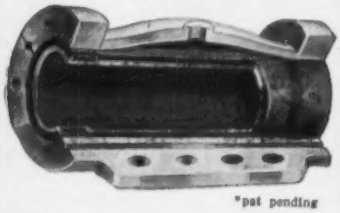
Quick Delivery

Plates, Structurals, Bars, Sheets, Tubes, etc. Carbon, Alloy, Stainless Steels, Babbitt Metal.

RYERSON

Joseph T. Ryerson & Son, Inc.
Plants at: New York • Boston • Wallingford, Conn. • Philadelphia • Charlotte, N. C. • Cincinnati • Cleveland • Detroit Pittsburgh • Buffalo • Chicago • Milwaukee St. Louis • Los Angeles • San Francisco Spokane • Seattle

RED JACKET VALVES
for Automatic Bin Loading of Food Products



*pat pending

This pneumatic control valve easily handles flour, cereal, cocoa, sugar, wheat, whey, molasses, dog foods, etc. in liquid or dry granular form.

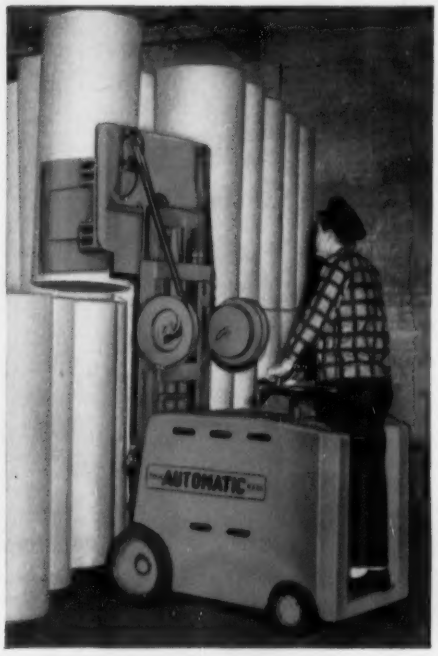
- Full ROUND PORT eliminates plugging of line—unobstructed flow
- No pockets for Food Decay
- Only one wearing part
  Blow-out protected
- Action of valve instantaneous
- Controlled automatically from time cycle programer or manually on location

Ask for Bulletin N-2 for complete details

RED JACKET COMPANY, INC.
500 BELL AVENUE, CARNEGIE, PA.

Automatic DOCKER...THE LIFT TRUCK THAT WORKS WHERE OTHERS CAN'T

Shortest in its class... unmatched for easy maneuvering ...and for efficient low-cost operation



PAPER—Marcal Paper Company slashes loading time per boxcar from 12 man-hours to 1½ man-hours. DOCKER illustrated is equipped with rotating paper roll clamp for unloading and tiering 800 lb. paper rolls.

Illustrated are only a few examples of the DOCKER'S versatility. This extra-compact, more maneuverable truck offers more advantages than any other of its type for materials handling in any industry. It is especially desirable where space is limited... works with ease inside trailers, freight cars and in aisles too narrow for other similar trucks.

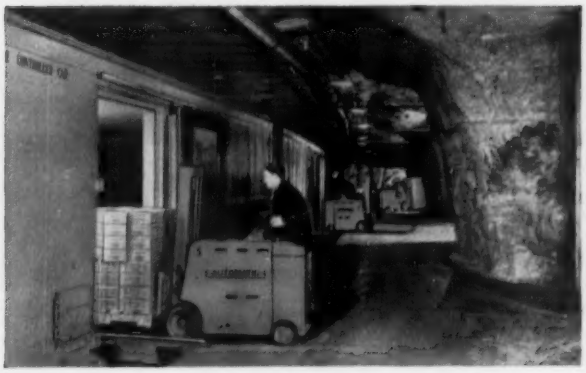
What's more, direct comparison shows clearly how definitely superior the DOCKER really is. Here are the figures:

	DOCKER	TRUCK A	TRUCK B	TRUCK C
2000 LBS. WITH LOAD LENGTH OF	48"	30"	40"	30"
SHORTER..... OVERALL LENGTH LESS FORK	53⅞"	65⅞"	65½"	64"
SAFER-EASY ON, EASY OFF..... STEP HEIGHT	7"	13"	13¾"	13⅞
MORE PRODUCTIVE..... LIFT SPEED F.P.M.	65	55	45	45
MORE VERSATILE..... GRADE CLEARANCE	45%	43.4%	45%	35%
MORE MANEUVERABLE... TURNING RADIUS	56"	59"	64"	57"
MAXIMUM HEAT PROTECTION. CLASS H, SILICONE INSULATED MOTORS—ALL MODELS	Yes	No	No	No

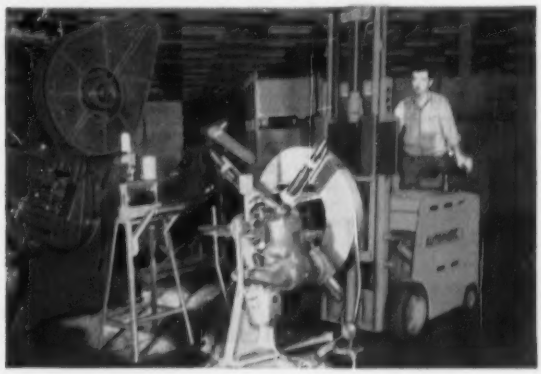
Send today for complete information including case histories of installations similar to your own.

Automatic

Dept. D-7 125 West 87th Street
Chicago 20, Illinois



FOOD AND COLD STORAGE—Operating in temperatures ranging from plus 38° to minus 10° F. dependable Automatic DOCKERS working around-the-clock speed handling of perishable foods for Inland Storage Co. Fifteen cars at a time can be unloaded at the above dock deep inside this mammoth "deep freeze."



FABRICATED METALS—DOCKER is placing steel coil on an automatic feed device for a punch press in the new Briggs and Stratton Plant, Milwaukee. Throughout this plant, which is a model for plant planners, DOCKERS keep materials moving from receiving through production to shipping.

Detail of PYREX pipe installation shown in small photograph below.

GLASS PIPE *preserves the sun-ripened flavor*

Here's the pattern for purity at the Lockport, N. Y. plant of College Inn . . . PYREX® brand glass pipe.

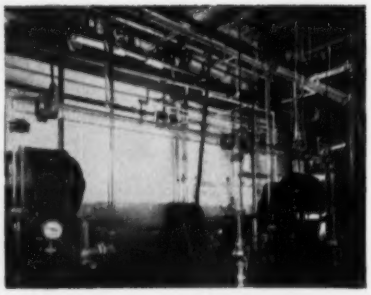
As in all choice food products, purity and flavor are vital and are to be protected at all costs. College Inn protects them economically and surely with PYREX glass pipe . . . more than a thousand feet of it . . . ranging in size from 1½" to 6".

Flavor is safe . . . because PYREX pipe imparts no flavor of its own to the product it carries. It's glass, as clean and corrosion-free as the glass the tomato cocktail will be sold or served in.

Purity is safe . . . because PYREX pipe is so easily cleaned . . . because you can always *see* that it's clean.

Profits are safe . . . not only because your product is improved . . . but because PYREX pipe itself is economical to install and maintain. Because it does not corrode, because it's rugged, it will probably long outlive its write-off life.

Your PYREX pipe distributor will be glad to help you plan a layout like this for your plant. Call him, or, if you do not know his name, write us for Bulletin EA-1, "PYREX brand glass pipe in the Process Industries."



A 6" PYREX glass pipe feeds tomato juice to three Viscolizers. The smaller pipelines carry the "Viscolized" juice to tanks.

Corning means research in Glass

CORNING GLASS WORKS, 54 Crystal Street, Corning, N. Y.

JUST OFF THE PRESS—

NEW CATALOGS AND BULLETINS

— Free For The Asking —

PLANT ENGINEERING

Air Circulator System

Concerns air circulator system designed especially for corn syrup tanks. Unit circulates filtered air inside tank to eliminate condensation. 1p.—*D. W. Fuller Co., Chicago. (227A)*

Plastic Filters

Plastic and rubber plate-frame filters for temperatures up to 170 F. are described. Compact units handle up to 30 gpm. *Bulletin GP-1, 2p.—Ertel Engineering Corp., Kingston, N. Y. (227B)*

Continuous Weigher

Treats of a continuous weigher that controls flow of dry, free-flowing materials. Technical data covering all components are given. Capacities run to 3,000 lb. per min. *Publication TP-6-M, 4p.—Wallace & Tiernan, Inc., Belleville, N. J. (227C)*

Heat Exchanger

Pictures plate heat exchanger with hydraulic ram, and gives details on bonded gaskets (on alternate plates), zig-zag flow plates, and adjustable ball feet. 4p.—*Kusel Dairy Equipment Co., Watertown, Wis. (227D)*

Plastic-Dip Tanks

Lists specifications for constant level plastic-dip tanks designed for melting cellulose-plastic protective coatings. Tanks are shipped ready to plug in. 4p.—*Oakland Metal Fabricators, Van Dyke, Mich. (227E)*

CIP Valves, Fittings

Pictures and describes automatic and manual cleaned-in-place diaphragm valves and fittings. 4p.—*Eastern Dairy Equipment Co., New York City. (227F)*

Panel Construction Systems

Describes formed steel members used for the panels of your own choosing to produce versatile wall. Numerous fittings available. 4p.—*Versabar Corp., Jersey City, N. J. (227G)*

Evaporative Condensers

Covers principles of operation and design details of a line of evaporative condensers. Dimension drawings and installation photos also included. 12p.—*Frick Co., Waynesboro, Pa. (227H)*

Humidification Systems

Describes nozzles, nozzle assemblies, float boxes, humidistats, solenoid-operated valves, and other components of compact humidifying units. Also illustrates nozzles for air washers and cooling towers. Bulletin 82, 4p.—*Spraying Systems Co., Bellwood, Ill. (227I)*

Aluminum Corrosion

Full-color presentation is a guide for determining corrosion resistance of aluminum to more than 100 chemicals. Aid to engineers in designing aluminum into process plants or other applications. Form C 12-5, 6p.—*Reynolds Metals Co., Louisville, Ky. (227J)*

Air and Vacuum Pumps

Has sectional photos and drawings, specifications list, and performance curves, of a line of air and vacuum pumps for agitating, blowing, separating, vacuum forming, and other applications. Accessories also included. Catalog 1957, 16p.—*Leiman Bros. Inc., Newark, N. J. (227K)*

Deep Well Pumps

Lists specifications for line of turbine pumps that deliver over 100 gpm. from deep wells. Also covers construction features and performance data. Bulletin 4701-D, 4p.—*Deming Co., Salem, Ohio. (227L)*

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Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard — back of book. Then sign at the bottom and mail.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

Stainless Pipe, Fittings

Hard-cover catalog has wealth of information on pipe, valves, fittings, and stainless steel specialties. Photos, drawings, complete description, and data tables accompany each item. Also has general information on stainless steel use. Catalog 157, 102p.—*Power Stainless Products Co., Passaic, N. J. (227M)*

Bronze and Steel Valves

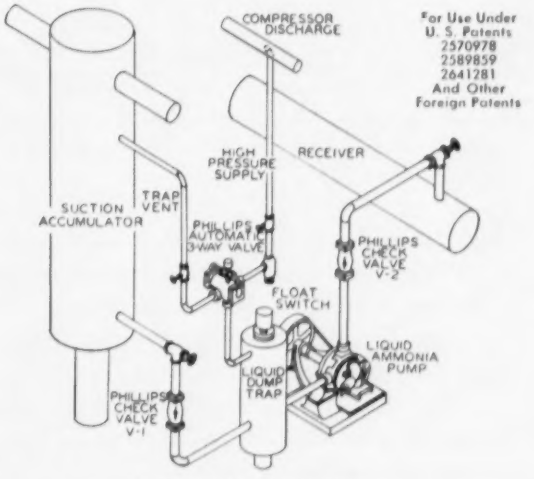
Well organized book has photos, dimension drawings, and specification lists for a line of steel and bronze valves. Included are globe, angle, check, hi-pressure drop, and other valve types. Appendix includes tables and flow charts. Catalog 200, 84p.—*Manning, Max-*

Ammonia "Slop-Over" Handled Automatically by PHILLIPS Liquid Return System

Protects Compressors, Saves Power, Makes Defrosting and Maintenance Simpler

Even in the best designed refrigeration systems, ammonia "slop-over" is a common occurrence. Two stage compression systems, booster systems and control ammonia compression systems subject to fast temperature and pressure changes are especially likely to have liquid in suction lines. This condition can seriously damage compressors which should handle dry gasses only.

Engineers at H. A. Phillips & Co. have devised a system that automatically returns "slop-over" directly to the receiver without regenerating and re-condensing the liquid. As shown in the drawing below, the Phillips Liquid Return System takes liquid ammonia which has collected in the accumulator, drains it through an outlet valve and check valve (V-1) into a liquid trap. Drainage occurs when the trap is at a low pressure. The trap is vented to the accumulator through a three-way valve and vent line. As the trap fills, a float switch is activated, energizing a three-way valve. This valve closes the vent line and connects the compressor discharge to the trap. Pressure builds up in the trap and closes check valve V-1. Pressure in the trap then reaches the same pressure as the receiver, opening check valve V-2 and allowing gravity to carry the liquid to the receiver. If gravity flow is not possible, a liquid ammonia pump is used. High pressure at both the pump inlet and outlet prevents flashing the liquid into gas. When the liquid trap is empty, the three-way valve is de-energized, closing the high pressure line to the trap. The trap is again vented to the accumulator, allowing liquid to drain once again into the trap.



Phillips Liquid Return System

This arrangement is highly efficient since only one pound of compression gas is required to move 25 pounds of liquid. There is practically no loss of refrigeration potential of the recovered liquid. The system also permits oil flushed into the accumulator to be easily drained.

A number of "packaged" variations of this system in capacities to 1000-tons are available to handle all arrangements of accumulator and receiver locations. For full details, write . . .

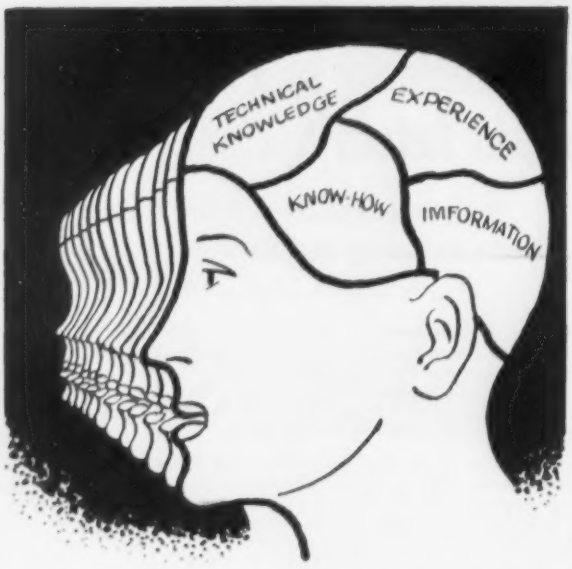
PHILLIPS

H. A. PHILLIPS & CO.

DESIGNERS AND ENGINEERS

REFRIGERATION CONTROL SYSTEMS

3255 W. Carroll Ave. • Chicago 24, Illinois



WHEN TWELVE HEADS ARE BETTER THAN ONE!

Are you considering a new product? Would you be interested in improving the market appeal of your present products? Are you interested in an impartial analysis of your present spice and seasoning ingredients?

The laboratory and production staffs of The Baltimore Spice Company are your most valuable source for technical knowledge and sound advice. Our products and services are well known by meat packers, canners, bakers and producers of food specialities. Our seasonings are a part of many successful branded items and as one of our customers expressed it "It's the flavor that wins customer favor".

Food manufacturers have found The Baltimore Spice Company competent and cooperative in solving many taste problems. You'll find it most advantageous to drop us a line about your seasoning requirements.

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well & Moore, Inc., Watertown, Mass. (227N)

Water Filters
Contains operational data on each model of a line of water and aqueous-liquid filters including gal. filtered per min., operating pressures, tube lengths, pipe sizes, inlet-outlet sizes, height, and weight. Bulletin GEO-501, 4p.—*Commercial Filters Corp., Melrose, Mass.* (228A)

Duct Insulation
Deals with insulation for air-conditioning ducts, giving pertinent physical and thermal property data, a table of standard sizes, thicknesses, and available facings as well as drawings. IN-177A, 6p.—*Johns-Manville, New York City* (228B)

Packaged Boilers
Offers choice of forced draft or induced draft fans on packaged boilers in sizes from 20 to 500 hp. Electronic controls are factory-installed and tested in operation. Bulletin 5743-EC, 4p.—*Hapman-Dutton Co., Kalamazoo, Mich.* (228C)

Fabricating Stainless Steel
Gives latest information on approved techniques for fabricating stainless. Useful for shop or manufacture. ADV. 590A, 40p.—*Republic Steel Corp., Cleveland.* (228D)

MATERIAL HANDLING

Meat-Packing Trucks
Has photos and data on trucks for meat industry including units for bacon chilling, condemned products, liver, meat pans, sausage hanging, and many others. Catalog 68-A, 32p.—*Allbright-Nell Co., Chicago.* (228E)

Truck Couplers
Pictures couplers and pins for trucks and tractors. No. 19, 1p.—*Elwell-Parker Electric Co., Cleveland.* (228F)

Portable Lifters
Catalogs portable lift truck line that picks up and releases automatically at proper height. The 29-in. wide unit can lift 1,000 lb. *Catalog 56F, 4p—Portable Lift Trucks, Inc., Cincinnati.* (228G)

Lift-Truck Operation
Lift-truck operation manual for operators, supervisors, and safety men. Slanted for beginners and experienced operators. Form 1214, 24p.—*Hyster Co., Portland, Ore.* (228H)

Meat Packing Conveyors
Furnishes complete layout for cattle and hog conveyor systems and provides details for all components. Catalog 63, 76p.—*Allbright-Nell Co., Chicago.* (228I)

Table Top Chains
Pictures both steel and nylon table top chains and sprockets. Also covers conveyor chain engineering, application, lubrication, and design. Bulletin 56-60, 27p.—*Chain Belt Co., Milwaukee.* (228J)

Pallet Loader-Unloader
Introduces equipment combinations now available for stacking or unloading cartons, bottles, and barrels. Unit consists of a case unstacker and a case stacker which have been integrated with the proper control mechanisms into a completely automatic unit. 8p.—*Food Machinery & Chemical Corp., Riverside, Calif.* (228K)

Continuous Feeders
Shows installation of continuous gravimetric and volumetric feeders for solids and liquids. Bulletin 10-N1, 4p.—*B-I-F Industries, Providence, R. I.* (228L)

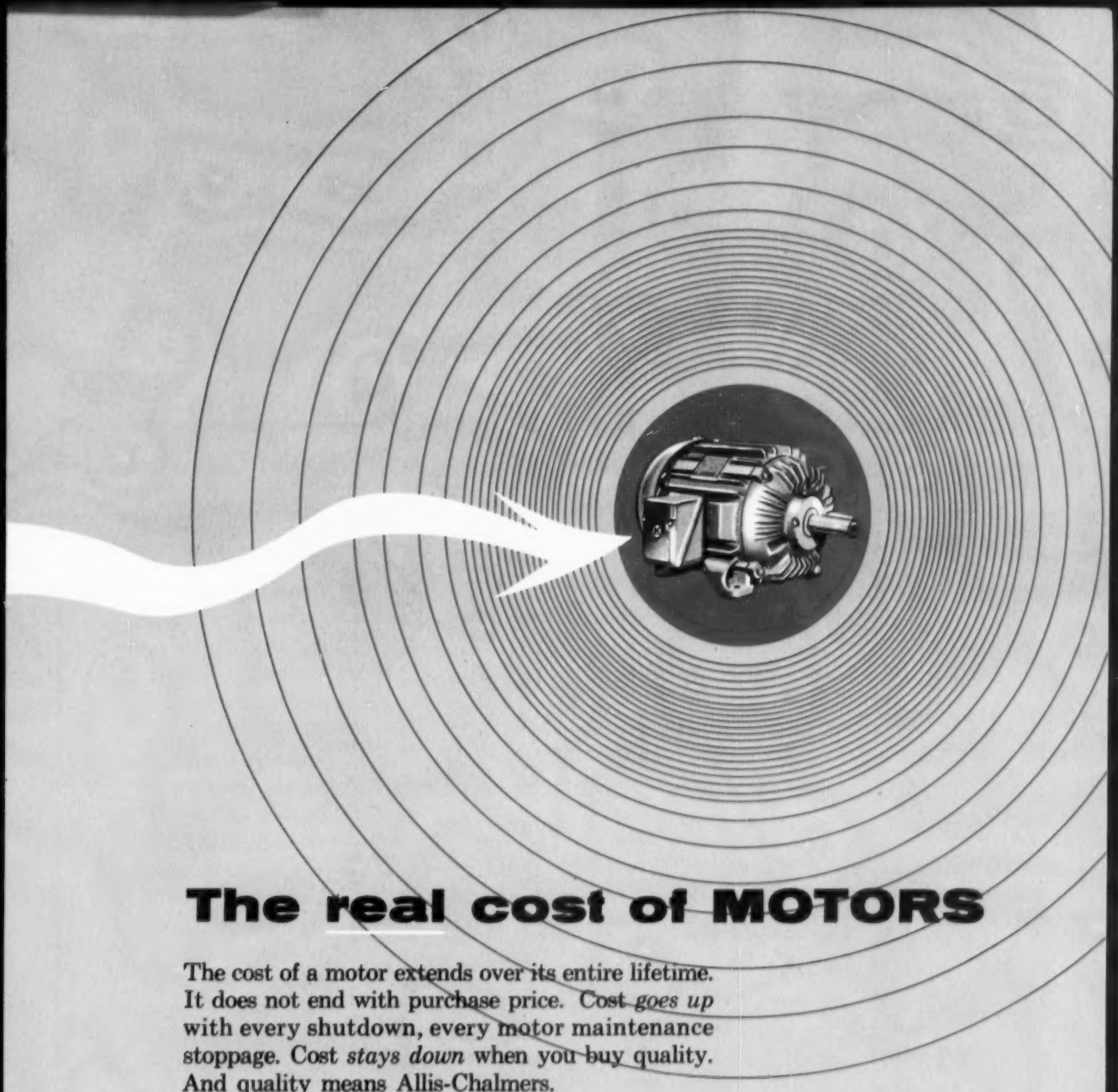
Trucks and Attachments
Tells about design, engineering, construction, and operating features of fork-lifts, towing tractors, and platform trucks. Clamps and other accessories are pictured along with dimensions and specifications. Catalogs BU-305, 387, 28p.—*Allis-Chalmers Mfg. Co., Milwaukee.* (228M)

Rotary Feeder
Announces unit for heavy-duty materials handling. Photos and cut-away drawings illustrate simplified design and construction. Data sheet DVc, 6p.—*Allen-Sherman-Hoff Co., Wynnewood, Pa.* (228N)

Chain Hoists
Describes construction of link or roller chain hoist. Has parts breakdown, photos, drawings, and specifications. Catalog 5092, 8p.—*Yale & Towne Mfg. Co., Philadelphia.* (228O)

Pallet Dollies
Has facts, photos, and data on a line of pallet dollies. Units run to 5,000 lb. capacity. Bulletin 700-B, 8p.—*Olson Mfg. Co., Inc., Chicago.* (228P)

Screw-Conveyor Drives
Presents easy selection method for screw-conveyor drives. Units are available in three reduction ratios, up to 10 hp., and speeds to 290 rpm. Catalog SCD-57, 8p.—*American Pulley Co., Philadelphia.* (228Q)



The real cost of MOTORS

The cost of a motor extends over its entire lifetime. It does not end with purchase price. Cost *goes up* with every shutdown, every motor maintenance stoppage. Cost *stays down* when you buy quality. And quality means Allis-Chalmers.

All of these extras that don't show on the Allis-Chalmers nameplate — more copper, more iron, more cooling provisions—exemplify the quality-craftsmanship that goes in before the price tag goes on.

For the "long run," either as a new machinery component or as replacement, specify Allis-Chalmers. Find out more about *real* quality in motors from your A-C district office or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-5287

LOOKING FOR SKILLED WORKERS?

Many Hungarian technicians with hard-to-get skills are available for immediate employment

A brand new source of skilled manpower is available now to American industry. If you believe you might use one or more Hungarian technicians, now at Camp Kilmer, New Jersey, write to:

President's Committee for Hungarian Refugee Relief, Camp Kilmer, New Jersey

While the column at the right includes only a partial listing of skills, many others are also available. Specify your job qualifications . . . describe your business . . . tell whether a knowledge of English is required and outline the housing situation. Arrangements may be made to interview applicants at Camp Kilmer if you care to do so. Should you hire a Hungarian technician you will not be obliged to pay for either his housing or his transportation from Camp Kilmer.

Your voluntary and enthusiastic cooperation can help meet an emergency situation. The A.F.L.-C.I.O. endorses this project and you will join with other corporations, relief agencies, universities, churches and thousands of civic leaders in a great undertaking. The operating staff of the President's Committee will also welcome your active interest.

A partial listing of skills

- Airplane Repairmen
- Architects
- Chemists
- Construction Machinery Operators
- Designers
- Draftsmen
- Electricians
- Engineers — Chemical
- Engineers — Civil
- Engineers — Electrical
- Engineers — Mechanical
- Engineers — Mining
- Fabrication Metal Products
- Fabrication of Textile Production
- Foremen Construction
- Furnacemen Smelters Pourers
- Loom Fixers
- Machine Shop
- Miners Mining Machine Operators
- Power Station Operators
- Radio Operators
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- Weavers Textile
- Welders Flame Cutters

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2 BIG NAMES *in the Frozen Food Industry*

Minute Maid Corporation, one of the nation's leading independent producers of frozen foods, has installed Clark Prest-O-Matic® Cold Storage Doors in its new modern plant in Auburndale, Florida. One big advantage of this fully automatic electric door is it speeds traffic for Minute Maid. Another important feature is that the Clark door helps maintain uniform storage temperature.

It is a completely packaged unit which includes the doors, operator, all hardware and controls.

WRITE TODAY for complete information.

CLARK SINCE 1878
DOOR COMPANY

505 HUNTERDON ST. • NEWARK, N. J.

"Got a BAKING PROBLEM, Mister?

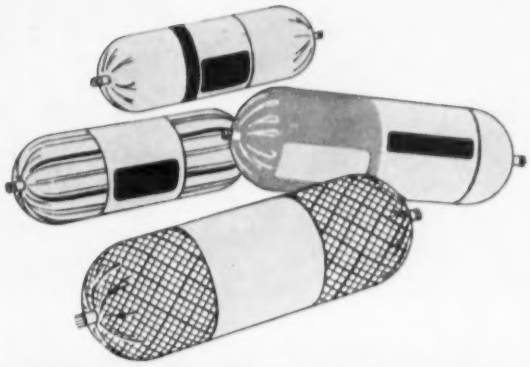
. . . call in the ADVANCE OVEN folks for EXPERT help!"

***Your production snagged by a problem in* BAKING? DRYING? STERILIZATION? CONVEYING food products? BATCH or CONTINUOUS OPERATION?**

Our young friend is right. The folks at ADVANCE are experts at such problems . . . they've been solving them for scores of happy clients for over 20 years. At ADVANCE you get custom-designed equipment at mass-produced prices. Why don't you call or write soon for free engineering advice and recommendation? No obligation.

ADVANCE OVEN COMPANY

714 So. 18th Street,
St. Louis, Missouri



YOUR PRODUCT SELLS FASTER IN "CHUB" PACKAGE

Kartridg-Pak's automatic machine makes complete Chub packages in sizes from 4 to 16 oz.

Forms, fills, and closes 1800 packages per hour Continuous — Automatic

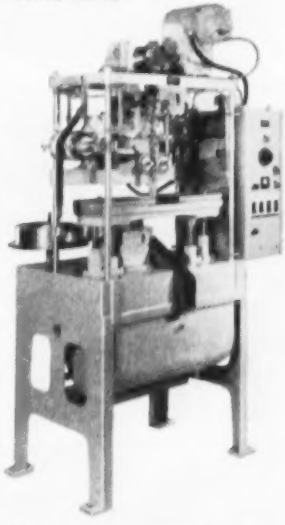
Makes a uniform, attractive package which means more impulse sales—more repeat sales for your product. And it's a convenient package for consumers to use. Gives added protection to your product.

Forms the package from flat roll stock thermoplastic film —saran, polyethylene, and others. Machine automatically closes package ends with wire clips made from roll stock wire.

Printed or plain film can be used. Package identification can be made by use of printed film, or by attaching attractive band labels.

Less total film and less labor are required with this automatic machine which means lower production costs. Flat film results in reduced film costs. Only one operator needed.

Machine accurately meters a semi-viscous product to control weight.



Floor space is saved. Machine is compact. Size 4 ft. wide x 3 ft. deep x 7 ft. high.

Low upkeep and maintenance are assured by the experience of present users.

For further details see Kartridg-Pak Representative

Kartridg-Pak Machine Co.

435 WEST SCOTT STREET, CHICAGO, ILLINOIS

For more data, circle this page number on card at back →

HERE'S THE MOST COMPLETE NOZZLE CATALOG EVER PUBLISHED

Whatever your nozzle problem, look first in this new catalog by Spraco. Here is complete information on a wide range of nozzle types and sizes as well as general spraying coverage data.

Send for your **FREE** *copy today . . .*

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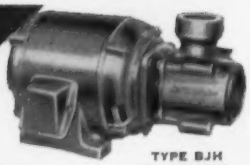
Engineering Company
113 Central Street, Somerville 45, Mass.

A GREAT NEW SERIES "by Aurora"



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HORIZONTAL

AURORA®
General Purpose
CLOSE-COUPLED
CENTRIFUGAL PUMPS

IDEAL for
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COOLANT
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CHEMICAL*
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*In special alloys to meet specific conditions

These are compact, simple, lasting pumps with low NPSH characteristics to meet critical suction conditions — for wide range of duties including hot water and chemicals handling.

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FLANGE MOUNTED

MANY VALUE FEATURES

SEALS or GLANDS — Available in either as desired.

SPEEDS — 3,500, 1750 (60 cycle) and 2,880, 1,440 (50 cycle) speeds.

CURRENT — AC or DC — All voltages and phases.

MOTORS — 1/6 to 7-1/2 H.P. drip-proof, splash-proof, totally enclosed, explosion-proof and chemical. Quiet, efficient NEMA standard.

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Models SL-8, SL-10, SL-12 Panel

Models MC-8, 10, 12

Model MC-8, 10, 12 Merchandiser

This Mark of Quality

BOYERTOWN "BETTER BUILT"

means **MORE VALUE PER DOLLAR**

for
- **COST-CONSCIOUS BUYERS**
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Delivery Vehicle Builders

for **85** *years*

Models MF-8, 10, 12 Merchandiser

Models MF B-8, 10, 12 Merchandiser

Model SL-10 Panel

BOYERTOWN AUTO BODY WORKS, Inc.
BOYERTOWN, PENNA.

For Information Write To:

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PROCESSING

Liquid Processing Units

Illustrates and describes line of stainless steel filters, mixers, tanks, and pumps. Catalog G-956, 40p. —*Alsop Engineering Corp., Milldale, Conn. (233A)*

Brew Kettle Percolator

Describes unit designed to increase rate of evaporation by vigorous thermal agitation at the center of brew kettle. More complete and faster hops extraction are claimed. 4p.—*F. C. Deckebach Sons Co., Cincinnati. (233B)*

Dry Screw Feeder

Describes screw feeder for metering dry materials. Vibration serves to fluidize material, while screw meters it out. Variable speed drive permits regulation of feed rate. 4p.—*Vibra Screw, Williston Park, N. Y. (233C)*

Material Weight Control

Contains discussion of system for automatic control of materials by weight. Some available optional attachments are dust-tight enclosures, sequence control, moisture compensation, tape drive dial. Form 707, 8p.—*Howe Scale Co., Rutland, Vt. (233D)*

High Speed Homo-Mixer

Specifies advantages of a combination homogenizing and mixing device that employs a specially designed rotor and stator. The high speed, high shear unit installs directly in process kettles and is specifically designed for the chemical industry. *Catalog 402-R*, 8p.—*Gifford-Wood Co., Hudson, N. Y. (233E)*

Rendering Equipment

Profusely illustrated catalog covers a variety of meat by-product equipment including cookers, hoppers, conveyors, cutters, tanks, trucks, washers, and many others. Catalog 66-B, 56p.—*Allbright-Nell Co., Chicago. (233F)*

Multi-Louver Dryers

Contains information on drying, cooling, and processing of bulk materials and has step-by-step descriptions of how new dryer works. Typical layouts, dimensional data, and a 2-page psychrometric chart are included. Book 2609, 16p.—*Link-Belt Co., Chicago. (233G)*

Spray Dryer

Introduces pilot plant spray dryers suited for research and small production runs. Evaporation rates of the stainless units run from 15 to 400 lb. per hr. Bulletin 431, 8p.—*Proctor & Schwartz Inc., Philadelphia. (233H)*

Stainless Food Equipment

Has photos of stainless trucks, troughs, tables, pails, pans, and scoops. 8p.—*Standard Casing Co., Inc., New York City. (233I)*

PACKAGING

Show Packaging

Explores aspects of display value, selection and use of color in corrugated packaging, and part packaging can play in special promotion. Full color bulletin has photographs of 30 packages. No. 3, 32p.—*Hinde & Dauch, Sandusky, Ohio. (233J)*

Four-Sided Package

Shows applications, construction, and filling machinery principles for pyramid package. Polyethylene coated containers are formed continuously from roll material, filled, and separated.—CZ-895, 8p.—*Crown Zellerbach Corp., San Francisco. (233K)*

Parts Feeder

Discusses unit that regulates flow of individual parts into containers. Catalog B-30, 4p.—*U. S. Engineering Co., Long Island City, N. Y. (233L)*

Heat Sealer

Discusses machine that heat seals coated, laminated, or barrier materials. Unit has air-pressure regulator, power indicator lamp, heat indicator lamp, thermostat control, dwell timer, and electric counter. 4p.—*Product Packaging Engineering, Culver City, Calif. (233M)*

Tin Can Film

Traces life of tin can from raw material to consumer. Form MP 151, 4p.—*United States Steel Corp., New York City. (233N)*

Package Coder

Describes applications and operations of a package coder for imprinting code or date on flat cartons. Case studies of successful installations are provided. Form B2286, 10p.—*Pitney-Bowes, Inc., Stamford, Conn. (233O)*

Packaging Cost Reduction

Discusses designing, testing, and storing of packages from economy point-of-view. Case histories point up cost savings. No. 5, 24p.—*Hinde & Dauch, Sandusky, Ohio. (233P)*

Container Consultants

Information on company offering consulting services, research

Here's

BIG-VOLUME SIFTING

with BIG SAVINGS!

RICHMOND/SPROUT-WALDRON

Gyro-Whip Sifters

Amazingly compact, yet big in output, Gyro-Whip Sifters save floor space. Simplified design reduces maintenance and cleaning time and makes possible the most rigid standards of sanitation.

The average Gyro-Whip is only 48" high, requires only 3½' x 3½' floor space, and operates on only ¾ h.p. Bolting areas range from 47.5 up to 95 sq. ft.

These Gyro-Whip Sifters are available in sizes from 3-sieve to 20-sieve mounted models. Also available are free-swinging supersifters with as many as 180 sieves. Can sift from 2 mesh up to 325 mesh. Stainless steel and wood construction. Aspirator tips to air wash graded products can be provided. Installation can be on the stream. It is a self-contained unit, ready to be bolted down and connected to existing spouting.

Write for Bulletin 135-A.

PR/808-P

SPROUT-WALDRON

Manufacturing Engineers Since 1866

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EQUIPMENT FOR SIZE REDUCTION, MIXING & BLENDING, PELLETING & CUBING, BULK MATERIALS HANDLING, PRODUCT CLASSIFICATION.

Here's the low-cost way to clean and fill gallon jugs

One-Man Cleaning. With a Cherry-Burrell 42nd Washer, one operator can pressure wash, rinse, sterilize a full case of gallon jugs and all other standard bottles—every 40 seconds. Three-compartment design gives every bottle and every case (1) a hot alkali scouring under pump pressure; (2) a clear water pump pressure rinse; (3) a steam or chlorine sterilization.

One-Man Filling. And for short-run production lines, one man—with a Cherry-Burrell "Han-D" Filler—can easily hand fill, cap and case up to 6 gallons per minute . . . handle all standard bottle sizes at regular 2-valve filling speeds.

For further information, see your Cherry-Burrell Representative or write for literature.

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427 W. Randolph Street, Chicago 6, Ill.

Dairy • Food • Farm • Beverage • Brewing • Chemical • Equipment and Supplies

SALES AND SERVICE IN 58 CITIES—U.S. AND CANADA

and development, design and engineering, testing, and special studies of packaging and handling. 16p.—*Container Laboratories, Inc., New York City. (233Q)*

Bagging Machine

Illustrates unit designed to automatically select empty polyethylene, film, and paper bags from a magazine, open and hold them ready for filling by hand, or accept delivery from automatic weighing or filling machines. 2p. —*Autopack Ltd., Birmingham, England. (234A)*

End-Loading Cases

Refers to unit for forming, loading, and side-sealing end-loaded cases. Savings in case materials by this system are listed. *Form 100-57, 4p.—J. L. Ferguson Co., Joliet, Ill. (234B)*

Filler and Capper

Full color pictures depict ice cream filler and capper. Some of this unit's features are table-lift mechanism, variable-speed drive, one-shot lubrication, and adjustable legs. A variety of nozzles and attachments are available. 6p. —*Anderson Bros. Manufacturing Co., Rockford, Ill. (234C)*

Paper Selector Gadget

Provides information on protection offered by multiwall bag papers, properties of multiwall bag papers, description of various papers, and repesentative list of products using particular combinations—all in slide-rule form.—*St. Regis Paper Co., New York City. (234D)*

Bread Wrapping Ideas

How-to-do-it manual deals with proper handling and storage of wrapping materials, installation and maintenance of wrapping machinery, and proper operation of machinery in wrapping the product. 20p.—*Wax Paper Merchandising Council, Chicago. (234E)*

SANITATION

Water Conditioner

Concerns a water conditioner, effective in neutral to high pH solutions, composed of chelating agents, water softeners, and wetting agents. By chelating iron, calcium, and other elements, it increases wetting ability. *Bulletin 1047A, 1p.—E. F. Drew & Co., Inc., Boonton, N. J. (234F)*

Plant Sanitation Program

Outlines practical program for food plant sanitation on basis that it is a unit process. Besides cleaning equipment, booklet covers conveyor lubrication, produce washing, scale removing, paint stripping, destroying odors, and washing truck fleets. Booklet F. 9414 R1, 12p.—*Oakite Products, Inc., New York City. (234G)*

Vacuum Cleaner

Treats of a line of four standard vacuum cleaner models of 30- and 55-gal. capacities. Normal operation creates a vacuum of 8-in. of mercury for picking up both wet and dry materials. 4p. —*Vac-U-Max Sales Co., Belleville, N. J. (234H)*

Germicide-Fungicide

Gives complete technical data on peracetic acid for sanitation uses in the food industry. Bulletin 15, 20p.—*Food Machinery and Chemical Corp., Buffalo, N. Y. (234I)*

INSTRUMENTS

Pressure Transmitters

Concerns both pneumatic and differential pressure transmitters that have adjustable ranges. Similarity of construction simplifies operation and maintenance. Folios 56-12, 13A, 8p.—*Republic Globe Meters Co., Chicago. (234J)*

Instrument Air Dryer

Specifies dessicant-type dehydrator for use in instrument lines. Consists of head, case and dessicant cartridge. *Catalog 3150, 4p. —King Engineering Co., Ann Arbor, Mich. (234K)*

Mercury Switch Controls

Furnishes data on single-stage, two-stage, and differential pressure, as well as single and two-stage temperature, liquid level, and mechanical movement controls. Easy access to control description is provided by dual index. Catalog 857, 56p.—*Mercoid Corp., Chicago. (234L)*

Precision Thermometers

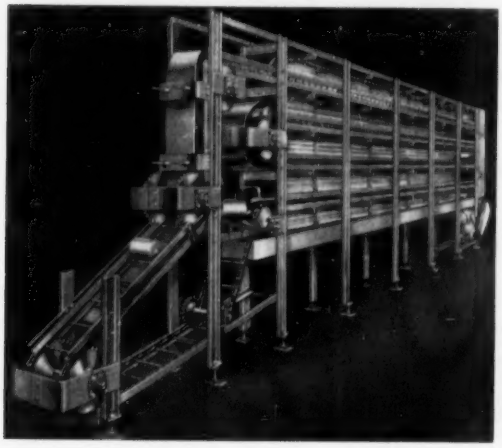
Treats of thermometers calibrated to give exact reading at a specific point. Many models are available and stainless construction is featured. Bulletin 13E, 5p.—*W. C. Dillon & Co., Van Nuys, Calif. (234M)*

Process Refractometer

Announces new automatic units

The CAMCO ROLL-THRU

THE CAMCO-ROLL-THRU-UNIT can be fitted as a **PASTEURIZER** or as a **COOLER** or as a **combination PASTEURIZER-COOLER**. Its efficiency is very high for products that can be slowly rolled without injury and are in round containers, either tin or glass.



THE CAMCO-ROLL-THRU is fitted with the highly efficient **CAMCO-HOT-WATER-PASTEURIZATION SYSTEM** in the pasteurization section, and with the highly efficient **CAMCO-EVAPORATIVE-COOLING SYSTEM** in the cooling section. All containers receive precise, uniform, equal treatment. The result, a highly uniform product with ready consumer acceptance.

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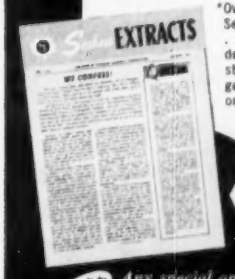

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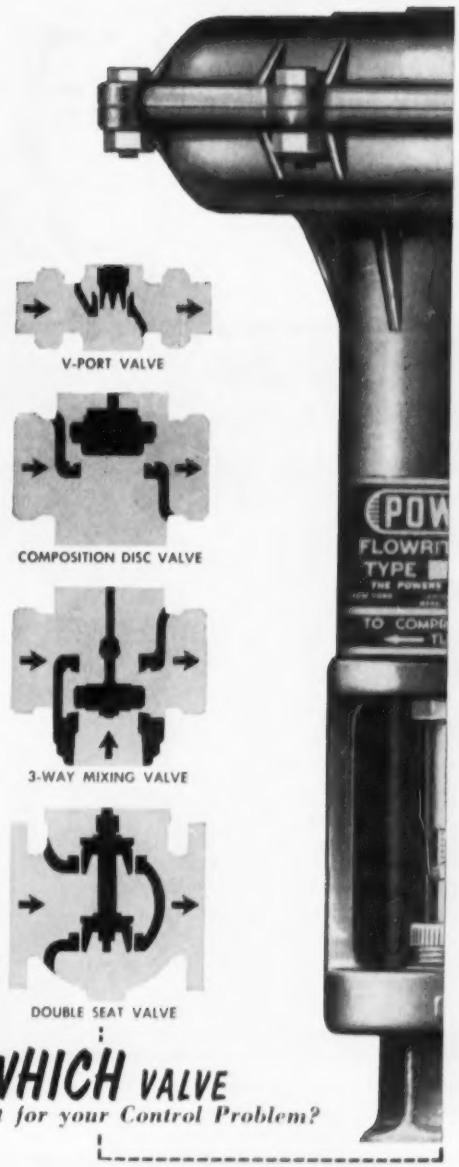

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The sliced product is fed directly from the slicer onto a vibrating screen deck. Due to the vibration, introduced by an eccentric drive, the slices move along the screen deck with undersize and broken pieces falling through to a flat bottom trough. Slices of proper size move along on the screen deck and discharge to the production line. Material falling through the screen deck is conveyed along the trough and falls to a removable container for disposal.

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Bulletin 53 SC—Trucks for In-Plant Feeding

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that plot refractive index changes of any non-opaque liquid or gas stream. Applications include checking and controlling product purity, blending of two streams, and concentrations of solutions. Bulletin R-1000, 3p.—*Phoenix Precision Instrument Co., Philadelphia.* (234N)

Pyrometer Supplies

Contents include thermocouple theory and practice, technical data charts, listings of thermocouples, mounting attachments, and components. Guide G-100-7, 54p.—*Minneapolis-Honeywell Regulator Co., Philadelphia.*

QUALITY CONTROL

Laboratory Units

Catalogs additions to laboratory supply line including pocket pH meter, gas chromatograph, vacuum gage, Teflon gland, and polyethylene items. No. 27, 24p.—*Scientific Glass Apparatus Co., Inc., Bloomfield, N. J.* (237A)

X-Ray Microscope

Shows X-ray microscope and typical X-ray photos. Principles of operation and functions of components are discussed. Publication 7A-3691, 16p—*General Electric Co., Milwaukee.* (237B)

Laboratory Apparatus

Informs on variety of lab equipment, including pocket pH meters, balances, portable instrument desks, polyethylene sink traps, Teflon equipment, and others. Review No. 7, 20p.—*Arthur S. LaPine & Co., Chicago.* (237C)

Ion-Exchange Resins

Informs on availability of analytical-grade ion-exchange resins and their selection. List M, 4p.—*Bio-Rad Laboratories, Berkeley, Calif.*

Juice Spoilage Organisms

Discusses growth characteristics of spoilage organisms in orange juice and concentrates. 12p.—*Continental Can Co., New York City.* (237D)

Lab Glassware

Describes line of glass aspirator bottles, funnels, stop cocks, and other lab equipment. Catalog 80C100, 16p.—*Fischer & Porter Co., Hatboro, Pa.* (237E)

TRANSPORTATION

Steel Van Line

Details construction features of 92½-in.-wide steel vans. Refrigerated, dry freight, and livestock units can be had in aluminum, stainless, and corrugated high-tensile steel. 5p.—*Fruehauf Trailer, Detroit.* (237F)

Dry-Ice Bunker

Covers applications of dry ice truck bunkers. Unit has dry ice resting over a 2-in. bottom air duct. Fan forces air along length of the chilled plate. 4p.—*Foster-Built Bunkers, Inc., Chicago.* (237G)

Bulk-Feed Bodies

Shows workings of pneumatic-delivery body, hydraulic screw-feed body, molasses-feed body, and combination bulk-feed transport bodies. Numbered photos cover component parts of each unit. Form A-414, 4p.—*Banghman Mfg. Co., Jerseyville, Ill.* (237H)

Truck Leasing

Defines truck leasing terms such as leasing, rental, gypsy-leasing, and driver-owner. 2p—*National Truck Leasing System, Chicago.* (237I)

Cost Record Book

Contains forms for keeping record of truck operating costs and instructions for using same. Form AD-425, 30p.—*White Motor Co., Cleveland.* (237J)

Truck Refrigeration

Considers line of truck refrigeration units with only two moving parts. Fan blows air through dry ice bunker. Form C-150, 4p.—*Hunter Mfg. Co., Solon, Ohio.* (237K)

MANAGEMENT

Engineering Consultants

Informs on background and capabilities of staff designed to supplement or provide the functions of an engineering department. Group specializes in analysis, design, and proposals on mechanical, hydraulic, pneumatic, and mechanical systems and components as well as air conditioning, training devices, high-speed machinery, and

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125 HP Leffel boiler shipped to Viroqua Cooperative Creamery, Viroqua, Wisconsin—their first Leffel boiler.

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March 30, 1951
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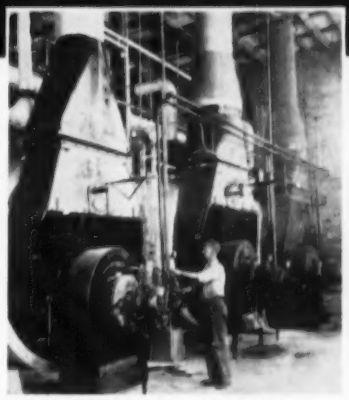

Two 200 HP Leffel Scotch Boilers and one 125 HP Leffel Scotch Boiler in the boiler room of the Viroqua Cooperative Creamery, Viroqua, Wisconsin.

VIROQUA has progressed with Leffel through two plant expansions which have more than tripled their steam generating capacity because they've learned by experience that Leffel boilers are . . .

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Leffel has served the dairy industry for 95 years and understands its requirements well. Today's Leffel boilers reflect this know-how in their quality construction and fine workmanship. If you're boiler conscious right now, get all the facts before deciding on any one make of boiler. If you do, we're sure that Leffel will surpass your requirements for efficiency, dependability and economy. And you'll appreciate doing business with a company which believes follow-through on every transaction as important as the original purchase.

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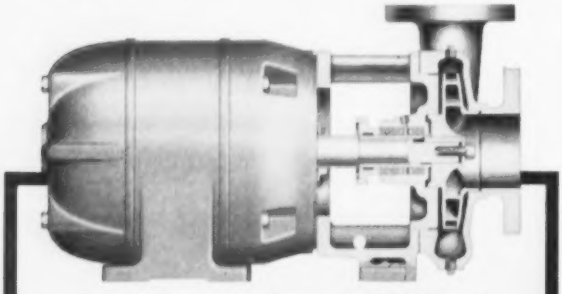

Type "GSC" centrifugal pump with Foot Mounted Motor. Also available with Round Frame Motor.

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structures. Also makes industrial management studies. 10p.—*Derivations, Bay Shore, N. Y.* (237L)

Family Test Panels

Reports on use of representative families to conduct surveys and test new and improved products. 16p.—*National Family Opinion, Inc., Toledo, Ohio.* (238A)

Research Laboratories

Furnishes information on organization offering research and development services in chemistry, bacteriology, biochemistry, and toxicology. 12p.—*Reuter-Hixson Laboratories, Chicago.* (238B)

Safety Film

Considers four films on subject of safety and the foreman. Bulletin 15706, 5p.—*National Safety Council, Chicago.* (238C)

Shipment Addressing

Uses flow chart, photos, and drawings to tell how to streamline shipment addressing. Bulletin F-120, 16p.—*Weber Addressing Machine Co., Mount Prospect, Ill.* (238D)

Industrial Research Outlook

Treats of how management looks at the future of industrial research. MRI 188, 6p.—*Midwest Research Institute, Kansas City, Mo.* (238E)

Mailing Lists

Booklet catalogs mailing lists offered according to title, number, and price. 50p.—*S. S. Hofheimer, New York City.* (238F)

Delivery-Date Calculator

Handy slide rule calculator aids rapid calculation of delivery dates and other calendar computations. —*Nooter Corp., St. Louis,* (238G)

Annunciator Systems

Bulletin on annunciators discusses company facilities, functions, applications, technical information, components, and ordering information for systems. Drawings, photographs and tables air fourteen-section presentation. *Catalog 100B,* 32p.—*Panellit, Inc., Skokie, Ill.* (238H)

Embezzlement Controls

Contains practical methods for combating embezzlement of money, merchandise, and other materials. Has a check-list for spotting adequacy of a firm's embezzlement controls. 32p.—*Fidelity & Deposit Co., Baltimore.* (238I)

Motion Study Films

Reviews motion study and work sampling films. Available in color or black and white, films are either rented or sold. *Vol. X, No. 23,* 4p.—*U. of California, Los Angeles.* (238J)

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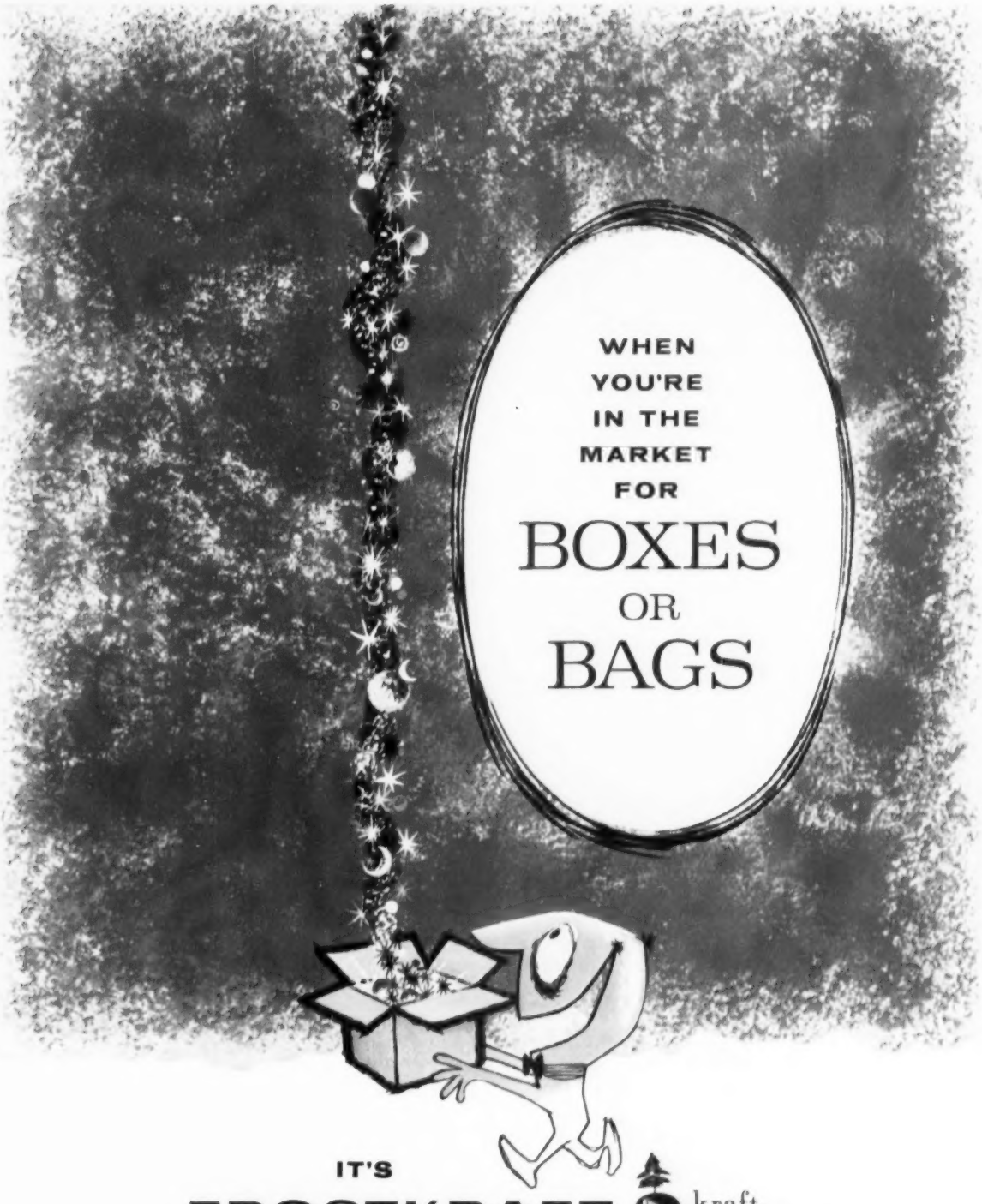

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ADVANCES IN FOOD RESEARCH (*Vol. VII*). *Edited by E. M. Mrak and G. F. Stewart. Published by Academic Press Inc., 111 Fifth Ave., New York City 3. 1957. 404 pages, cloth. Price:* $9.50.

This latest addition to a valuable series presents seven articles: three on specific commodity problems, four on functional problems encountered in processing and marketing foods.

The articles deal with the profile method of flavor analysis, preservation of fish with chemical agents, water relations of food spoilage microorganisms, chlorine in food plant sanitation, freeze-drying, gelatin, and licorice.

Complete references are offered with each article. Book is indexed and illustrated.

Math On the Production Line

ANALYSIS FOR PRODUCTION MANAGEMENT *by Edward H. Bowman and Robert B. Fetter. Published by Richard D. Irwin, Inc., Homewood, Ill. 1957. 503 pages, cloth. Price:* $7.80.

The authors of this comprehensive book, both instructors at Massachusetts Institute of Technology, believe that analysis, particularly mathematical analysis, can provide a key to many current production problems.

Because of this, there is the restrictive factor that the reader is expected to have a university-level grounding in mathematics, economics, and statistics.

The book begins with a review of the history of manufacturing problems. Then the reader is guided through the complexities of mathematic programming, and statistical and economic analysis.

Guide to Sugar Economy

MANUAL OF SUGAR COMPANIES 1955/56. *Published by Farr & Co., 120 Wall St., New York City 5. 1957. 325 pages, cloth. Price:* $3.

This 33rd annual edition provides a wealth of statistical and economic data on sugar, as well as an informative guide to the major sugar companies.

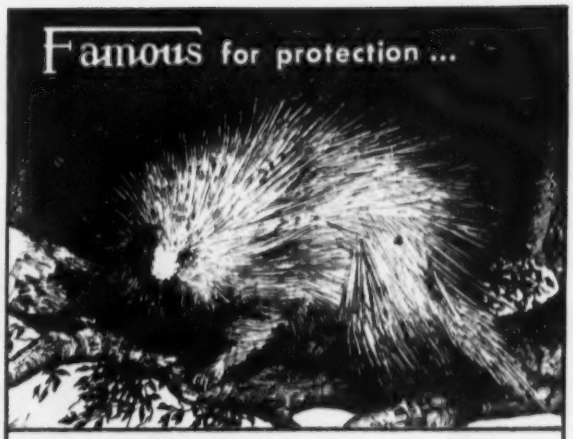
All companies are listed alphabetically. Information is presented on capitalization, properties, history, production and earnings, income and surplus, price range, and officers.

Statistical tables cover allotments, production, quotas, and other important aspects of the field.

Booklets & Reports

UTILIZATION AND DISPOSAL OF POULTRY BYPRODUCTS AND WASTES (*Marketing Research Report No. 143*). *Published by USDA, Washington 25, D. C. No charge.* Report based on survey of 343 poultry sluaghtering plants and 55 rendering plants.

RETAIL TRADE, UNITED STATES SUMMARY (*Bulletin R-1-1*). *Published by U. S. Dept. of Commerce, Washington 25, D. C. 111 pages, paper. Price:* $.40. *Statistics compiled in 1954 Census of Business.*



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Saves bearings, material, power, time...and...labor.

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You can forget about flies entering conveyor door openings when you protect your plant with Searls Fly-Bar* . . . the amazingly simple device that delivers a continuous and protective blast of air across incoming and outgoing milk cans, cases and boxes.

Thanks to Searls Fly-Bar, flies can't ride in on your milk cans. Searls fast-moving, protective air screen is broad enough—and powerful enough—to stop flies and all other filth-bearing insects from flying through it, crawling through it . . . or crawling *around* it.

ASK THIS MAN

— your Cherry-Burrell Representative — to show you how Searls Fly-Bar gives you positive fly protection . . . at surprisingly low cost. Better ask him *now*, before flies are "in season."

*trade-mark. Patents applied for.

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SALES AND SERVICE IN 58 CITIES — U.S. AND CANADA

Dairy • Food • Farm • Beverage • Brewing • Chemical • Equipment and Supplies

Method for Checking Labor Performance

—*Continued from page 65*

The idea of a "standard error of the percentage" is useful. For instance, if you want to know the range within which your percentage will fall 95 times out of 100, for the number of observations taken, you merely bracket your percentage estimate by two "standard errors of the percentage."

In other words, suppose we've taken 300 observations on Worker (A) and have an estimate for him of 40%. Our formula now gives us:

$$\text{Standard error of percentage} = \sqrt{\frac{.4\,(1-.4)}{300}} = 2.8\%$$

Thus, 95 times out of 100 our percentage will be between 40 ± 5.6 (two "standard errors of the percentage"), or between 34.4% and 45.6%. If this range is too wide, we merely take more observations. If you only want to be sure of your range 9 times out of 10, bracket your percentage with only 1.64 "standard errors of the percentage".

10) Analyze your data. Of course, your analysis will depend upon your own problems, your objectives, and your desired results. Our dairy-problem record-form illustrates what the data can show.

Continuing with the assumptions of our example: In the processing department, our check shows a rather even work-load among the employees—a 22%-idle figure that suggests a rather efficient department. Accordingly, we won't follow up here with detailed labor studies—at least, not until we take a closer look at some of the other departments.

Then, in the receiving department, we discover that only one-half of the time is being spent productively. In fact, Worker (J) is busy but 20% of the time. Previous studies had indicated that a little labor-efficiency work might be well in this area. Likely it will now be concluded that we can get along with just one man here.

Another obvious place to promote increased efficiency is the service department. This seems to be a clearcut case of too many people for the work to be done, and so it certainly suggests a closer examination.

The empty bottle department, back at our starting point, seems to be in fairly good shape. However, we note uneven work-loads and high idle-time percentages in the bottling and cold storage departments. Some efficiency work should probably be applied here.

Of course, you can glean other information from these data. For instance, you might want to see what percentage of the total working time is spent in each department. And you can likely get other ideas by further study of our record form.

11) Make use of the analysis. Too often, a good analysis is buried in someone's desk drawer, and so dies a pathetic death of suffocation or obsolescence. Don't let this happen. Start working immediately on the dollar-saving improvements suggested by your study.

In some areas, you'll find there's very good reason for your present labor use, though it may have appeared to be wasteful. But in other areas you may find labor applied without good reason. The latter cases call for your attention.

True enough, the matter of subsequent department modifications and revisions is a subject separate from our present consideration of the study technique. But of course your follow-up is vitally related.

End (*Resume reading on page 66*)

Cut label inventories with the Tickometer—

"Checked your label stocks lately?" asked one Purchasing Agent. "Ours were a mess! Label requirements are often overestimated, and we place big orders to get the best prices. I found ten years' supply on hand for certain items, and whole cases of obsolete labels."

• You can limit your labels to a few basic forms and sizes, and use a Tickometer to imprint designations as needed —weight, grade, size, color, type, and code or date. You can carry smaller inventories, save space and records, reduce printing bills, and avoid label waste.

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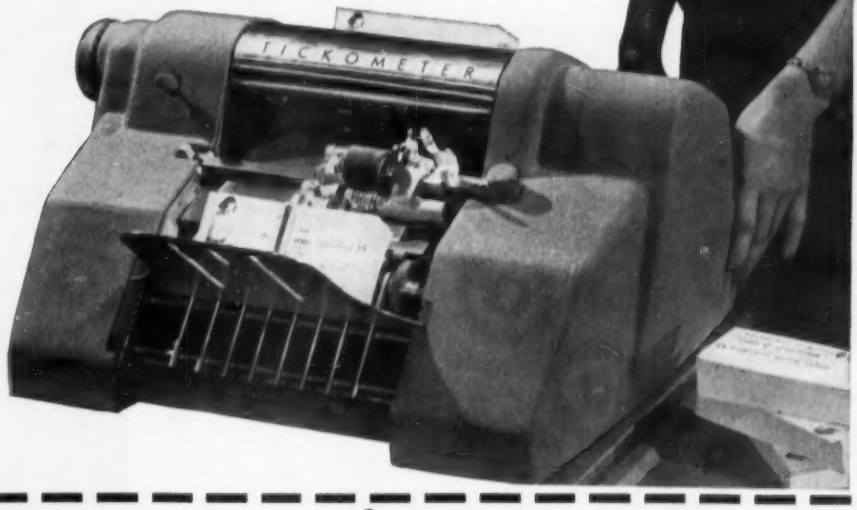
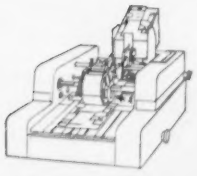
• The Tickometer can also be used to mark, stamp, cancel checks ... and tickets, tags, sales slips, forms, coupons, etc., at a considerable time saving. Rented, or sold. Nationwide service from 296 cities. Ask the nearest PB office for a demonstration, or send coupon for free booklet.





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RECENT INVENTIONS

PRODUCTS

Cake-Batter by Mixing 100 Parts Flour, 90 to 140 Parts Sugar, Emulsifier, Mixing, Adding 10 to 50 Parts Eggs and 10 to 50 Parts Oil—L. B. Crossland, Norwalk and H. K. Beasley, Redding Ridge, Conn. to R. T. Vanderbilt Co., Inc., New York City. No. 2,768,082. Oct. 23, 1956.

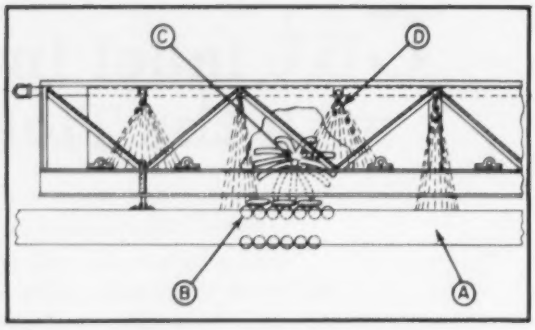
Anti-Oxidant Solution by Adding Butylated Hydroxyanisole to Edible Oil, Agitating, Forming Second Solution of Lecithin, Edible Oil, Adding Anti-Oxidant of Citric, Tartaric, and Phosphoric Acid Class, Adding a Gallic Acid Ester, Rapidly Cooling, Combining both Solutions—C. L. Griffith, Chicago and L. Fair, Evergreen Park, Ill. to Griffith Laboratories, Inc. No. 2,768,084. Oct. 23, 1956.

Meat-Curing Salt Composition Consisting of Flash-Dried Crystals of an Aqueous Solution Having Major Portion of Sodium Chloride and a Salt of Group Including Alkali Metal Nitrite, Alkali Metal Nitrate, Anti-Caking Materials—L. A. Hall and W. F. Kalchbrenner, Chicago to Griffith Laboratories, Inc. Chicago. No. 2,770,548-9-50-51. Nov. 13, 1956.

French-Fried Onion Rings Consisting of Onion Rings Coated with Batter, Cooked in Hot Deep Fat About 2 Min., Drained, Frozen, Cooked without Thawing—C. H. Allen, Albion, Mich. No. 2,771,370. Nov. 20, 1956.

Lactase Preparation Consisting of Spray-Dried Lactase and Sucrose—W. M. Connors, Bay Shore, T. Sfortunato, Patchogue, to National Dairy Research Laboratories, Inc., Islip, N. Y. No. 2,773,002. Dec. 4, 1956.

Want more information on any of these recent patents— if so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.



Unit Cleans Potatoes by Scrubbing, Spraying

Machine comprises table (A), conveyor mounted on table for rotating and advancing potatoes, consisting of closely spaced transverse rollers (B), and buffing members (C). These rotate in opposite direction of rollers, and carry fabric strips mounted on a shaft. Liquid spraying devices (D) are mounted above buffing members.—*R. J. Hession, New Orleans No. 2,778,042, Jan. 22, 1957.*

EQUIPMENT

Dough-Molding Unit Having Eccentric Roll-Mounting Means, Whereby Spacing Between Rolls Can be Rapidly Varied—H. C. Rhodes, Portland, Ore. No. 2,769,408. Nov. 6, 1956.

Extractor Having Means for Extracting Juice and Pulp from Fruit Halves, Juice Collecting Pans, Separator Grid —F. M. Alexander and R. W. Bruso, Winter Haven, Fla. to Brown Citrus Machy. Corp., Whittier, Calif. No. 2,769,472. Nov. 6, 1956.

Vegetable Peeler Comprising Container, Rotatable Disk Having Abradent Surface, Reversible Electric Motor, Re-

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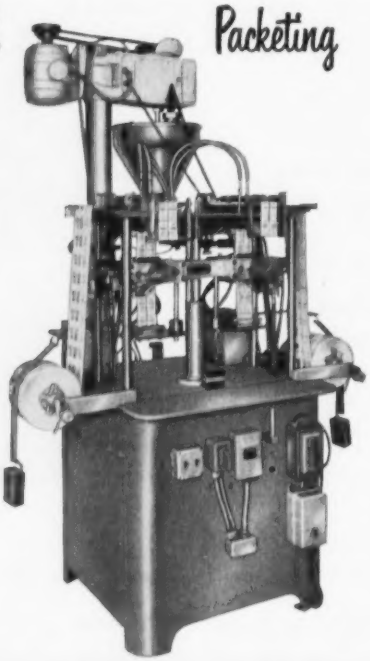

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versing Switch—W. R. Comber to Champion Dishwashing Co., Erie, Pa. No. 2,769,473. Nov. 6, 1956.

Fruit Inspecting and Rejecting Means Having Rollers Forming Pockets to Receive Indented Fruits, Means for Rotating Fruit—J. M. Hait to Food Machy. & Chemical Corp., San Jose, Calif. No. 2,769,521. Nov. 6, 1956.

Bread-Making Unit Wherein Dough is Mixed, Cut, Sheeted and Rolled Comprising Base Plate, Rotatable Disk, Movable Hooks, Fixed Guide—W. E. Lanham, Atlanta, Ga. No. 2,770,201. Nov. 13, 1956.

Bean-Snipper Comprising Pair of Conical Carriers Mounted at Right Angles, Snipping Means—F. A. Mencacci to Food Machy. & Chemical Corp., San Jose, Calif. No. 2,770,274. Nov. 13, 1956.

Spaghetti Handler Having Flexible Endless Carrier with Receptable, Feed Means—A. Curioni, Ridgefield Park, N. J. No. 2,770,351. Nov. 13, 1956.

Viscous Mass Proportioning Device Consisting of Vessels with Disformable Liner, Fluid Admitting Means, Expansion Chamber, Proportioning Chamber Between Vessel and Liner, Viscous Filling Means—W. Seabardt, Bromma, Sweden to International Ytong-Stabalite Co. Ltd., London, England. No. 2,770,395. Nov. 13, 1956.

Carton-Loader Having Vertical Conveyor, Turret Member, Supply Means, Resilient Members Adapted to Engage Cans, Rotating Means—B. J. Nigrelli, Skokie, Ill. to R. W. Johns, B. J. Nigrelli, and R. R. Johns, Chicago. No. 2,770,935. Nov. 20, 1956.

Crab Meat Extractor Combining Holder Supporting Skeletal Portion, Holder Rotating Means.—E. O. Hiller, Centerville, Mass. to Hartford National Bank and Trust Co., Hartford, Conn. No. 2,771,630. Nov. 27, 1956.

Crab Holder and Core-Cutting Device With Support for Carapace of Inverted Crab, Gripping Means.—E. O. Hiller, Hyannis, Mass., to Hartford National Bank and Trust Co., Hartford, Conn. No. 2,771,631. Nov. 27, 1956.

Fish-Packing Mechanism Comprising Rotatable Wheel Having Series of Fish Buckets, Body Clamps, Disk Knives.—H. E. Walker, to Walker's Fish-Machinery Inc., Bath, Maine. No. 2,771,632. Nov. 27, 1956.

Vegetable Degummer With Mechanism Imparting Progressive Reciprocating Motion to Conveyor Drive Chain Including Crank, Pawl, and Link Means.—C. R. Short and G. P. Brouillette to Florida Industrial Laboratory, Inc., Clermont, Fla. No. 2,771,785. Nov. 27, 1956.

Egg-Cracking Machine Comprising Frame, Rotatable Carrier Members, Cracking Blade.—C. H. Willsey, Topeka, Kansas. No. 2,771,926. Nov. 27, 1956.

Shrimp Peeling and Deveining Units Including Oscillatory Members, Shrimp Holders.—A. J. Matter, Park Ridge, Ill. No. 2,772,442. Dec. 4, 1956.

Grain Drying Bins Having Two Spaced End-Walls, Guide-Slots, Sump-Plate, Screw-Conveyor. R. W. Arndt, Columbus, Nebr. No. 2,772,487. Dec. 4, 1956.

Doughnut Apparatus Producing Scalloped Inner and Outer Peripheries, Comprising Extrusion Spout, Hole-Forming Island, Cut-Off Sleeves, Dough-Severing Fingers.—W. R. Coyne to Pillsbury Mills, Inc., Minneapolis. No. 2,772,643. Dec. 4, 1956.

Fruit Cutting, Spreading, and Pitting Machine Comprising Support, Table-Top, Endless Conveyors, Rotary Cutting Knife.—C. V. Rinehart, Tucson, Ariz. No. 2,772,710. Dec. 4, 1956.

Fruit-Halving Device Combining Movable Carrier, Lateral Fruit Restraining Members, Power Saw Positioned to Bisect Fruit.—E. W. Carroll, Redwood City to S & W Fine Foods, Inc., San Francisco. No. 2,772,711. Dec. 4, 1956.

PACKAGING

Olive-Jar Packer Having Elongated Folder of Plastic, Encompassing Means, Jar, Closures—M. D. Conte, Brooklyn, N. Y. No. 2,766,570. Oct. 16, 1956.

Wrapper Tear-String Units Having Conveyors for Wrappers, Feed Rolls, Cutting

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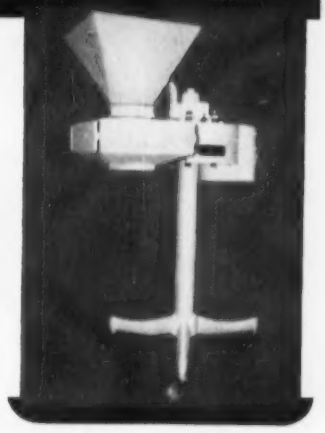

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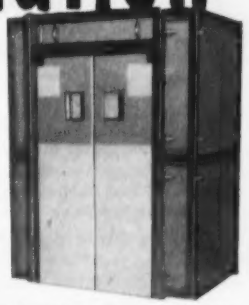

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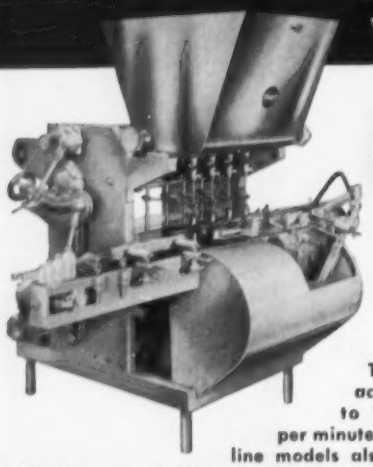

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Means, Clutch—F. C. Van Arsdale, Medina, Ohio to Quaker Oats Co., Chicago. No. 2,766,665. Oct. 16, 1956.

Foldable Multiple Compartment Box Having Side Walls, Bottom, and Double-Wall Center Partitions—A. Cormier to Cormier Paper Box Co., Ltd., Montreal, Que., Canada. No. 2,766,924. Oct. 16, 1956.

Package for Soft, Perishable Fruits Comprising Cardboard Box, Open-End Case of Transparent Material—F. C. Sloan, Dillingham, Wash. No. 2,767,699. Oct. 16, 1956.

Cheese Packaging by Enclosing Cheese in Heat-Sealable Wrapper, Subjecting to Pressure of 200 to 400 lb. per Pound of Cheese, Sealing—A. B. Erekson, Plymouth and J. R. Palmer West DePere, Wis. to the Borden Co., New York City. No. 2,768,085. Oct. 23, 1956.

Frozen-Food Package Comprising Cooking Condiment-Containing Sauce, Cooking and Draining of Foodstuffs, Placing Sauce in Container, Freezing, Filling Remainder with Foodstuffs, Closing and Freezing—L. E. Bliley, Virginia Beach, Va. No. 2,768,086. Oct. 23, 1956.

Sliced-Bacon Package Scored and Adapted to be Folded—J. H. Bonini, Appleton, Wis. to Marathon Corp., Rothschild, Wis. No. 2,768,779. Oct. 30, 1956.

Packaging Fluids, Jellies, Pastes, Fluent Powders, by Supplying Vinylidene Chloride Copolymer Tube—G. W. Cheney and A. L. Stark to Dow Chemical Co., Midland, Mich. No. 2,769,206. Nov. 6, 1956.

Package Consisting of Bottles Arranged About a Semi-Rigid Divider—J. K. Bruce, S. Pasadena to Bruce Engineering Corp., Menlo Park, Calif. No. 2,769,535. Nov. 6, 1956.

Cap and Opener Using Circular Body Having Peripheral Crimped Skirt, Opener Member—R. F. Lee, Houston, Tex. No. 2,769,560. Nov. 6, 1956.

Band-Applying Machine Having Cylindrical Plunger, Stripping Means Movable Longitudinally of Plunger, Fluid Pressure Means.—S. P. Carter, Shrewsbury, Mass. to Geo. J. Meyer Mfg. Co., Cudahy, Wis. No. 2,771,725. Nov. 27, 1956.

Cover Sterilizer Having Entrance, Exit, Screw Conveyor, Gas Distributing Means.—W. M. Martin, San Mateo, Calif. to James Dole Engineering Co. No. 2,771,644. Nov. 27, 1956.

Container Sterilizer Comprising Housing, Conveyor, Gas Distributing Means, Hood.—W. M. Martin, San Mateo, Calif. to James Dole Engineering Co. No. 2,771,645. Nov. 27, 1956.

Bag-Making and Filling Machine, Having Endless Carrier Including Grippers for Advancing Strip of Bag-Forming Materials, Bag Forming, Filling and Closing Mechanism, Sealing Means.—E. G. Williams, Toronto, Ont. No. 2,772,530. Dec. 4, 1956.

Filling Machine Comprising Reservoir, Liquid Metering and Dispensing Cups.—F. Brodsky, Brooklyn, N. Y. No. 2,772,531. Dec. 4, 1956.

Carton Formed From Single Blank Provided With Slit for Receiving Handle.—B. A. Rafoth and H. N. Hovland, Appleton to Marathon Corp., Menasha, Wis. No. 2,772,827. Dec. 4, 1956.

Self-Cooling Container Comprising Inner Receptacle, Outer Member, Cooling Cartridge Mounted on Bottom With Puncturable Closure Plug.—P. C. Palmer, Phoenix and A. O. Berry, Scottsdale, Arizona. No. 2,773,358. Dec. 11, 1956.

PROCESS

Digesting Vegetable Fibers Continuously by Causing Fibers Mixed With Reagents Under Elevated Temperatures to Descend Under Gravity Through an Upright Tower, Agitating the Mixture Near the Bottom of the Tower—F. G. L. Becker to Cellulose Development Corp. Ltd., Hatch End, Middlesex, England. No. 2,769,710. Nov. 6, 1956.

Sterlizing Food in Steel Containers with Heated Chlorinated Hydrocarbon Vapor—C. J. Kearney to Detrex Corp., Detroit. No. 2,771,023. Nov. 20, 1956.

Defibrating Continuously by steps of Freeing Digested Vegetable Fiber by Compressing From Digestant, Introducing

as Pressed Cake Into Hot Water, Breaking up Cake While Subjecting to Super-atmospheric Pressure—C. B. Birdseye, Gloucester and H. B. Stuck, Andover, Mass. to Process Evaluation & Development Corp., New York City. No. 2,771,361. Nov. 20, 1956.

Making Bread Using Sliced, Flattened Kernel Segments by Adding Yeast and Water, Mixing, Baking—N. D. Mininberg to Ella Mininberg, Stamford, Conn. No. 2,771,365. Nov. 20, 1956.

Preparing Fin-Free Fish Fillets by Incising Both Sides, Cutting Off Fins, Cutting for Fillet Removal.—A. F. A. Bartels and P. F. W. Jobmann to Nordischer Maschinenbau Rud. Daader, Lubeck, Germany. No. 2,771,633. Nov. 27, 1956.

Providing Bread Pan With Coating by Applying Polytetrafluoroethylene Film to Metal Web, Baking.—R. E. Lindsey, Redwood City, Calif. No. 2,771,668. Nov. 27, 1956.

Extracting Contents of Nuts by Freezing Outer Layer, Heating by High Frequency Field to Cause Explosion of Liquid Content.—O. Thaning, Eikenhof Transvaal, Union of South Africa. No. 2,771,927. Nov. 27, 1956.

Brewing Malt Beverages by Boiling Wort, Adding Hops, Producing Highly Localized Ebullition.—F. O. Rickers, Cincinnati to George Wiedemann Brewing Co. Inc., Newport, Ky. No. 2,772,975. Dec. 4, 1956.

Making Margarine From Fat, Milk, Salt, and Water by Cooling, Agitating, Super-cooling.—W. H. Schmidt, Englewood, N. J. and S. I. Shaffer, Melrose, Mass. to Lever Bros. Co., New York City. No. 2,772,976. Dec. 4, 1956.

Treating Animal Brains With Sodium Chloride, Sodium Citrate, Blanching.—J. N. Lesparre, Chicago and C. J. Filipowicz, Lockport, Ill. to Armour & Co., Chicago. No. 2,772,980. Dec. 4, 1956.

Producing Fruit Juice Concentrate by Evaporating, Absorbing, and Recovering Flavoring Materials.—A. G. McCarthy, Tampa, Fla., and C. A. Irazoqui to National Engineering and Development Corp., New York City. No. 2,772,774. Dec. 11, 1956.

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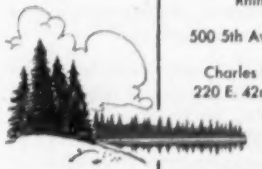

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St. Louis Independent Packing Company, a division of Swift and Company, required a very special innerwrap for their new Hickory Hill brand individual pork sausage patties. This innerwrap had to provide protection against water vapor transfer; be greaseproof; withstand the stress of opening and re-closing; could not stick to the individual patties; be printed with special inks and *still* be economical.

Innerwrap by Western-Waxide—Container by Sefton Fibre Can Co.—Label by Reynolds Aluminum Co.

Solution:

Western-Waxide's package research scientists and food technologists, drawing on their previous experience in solving packaging problems, selected .00035 aluminum foil as the basic barrier material for this unique innerwrap. However, foil itself was only part of the answer. Frequent laboratory testing under refrigerated storage conditions and simulated consumer use soon showed that a lamination of bleached 21 lb. M.G. paper, special adhesive laminated to the foil, provided the required extra margin of strength, resistance to tearing during opening or closing and a superior printing surface.

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NATIONAL COVERAGE

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

Positions Vacant	Civil Service Opportunities	Employment Services
Positions Wanted	Selling Opportunities Wanted	Employment Agencies
Part Time Work	Selling Opportunities Offered	Labor Bureaus

DISPLAYED —RATES— **UNDISPLAYED**

The advertising rate is $18.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

$1.50 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Box Numbers—counts as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS to FOOD ENGINEERING, 330 W. 42nd St., N. Y. 36, N. Y., for May issue closing April 26th.

REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

Wanted: Development engineer by established company manufacturing dairy plant equipment and machinery. Supervise new products planning for equipment used in processing ice cream, soft frozen dairy products, all types of cheese including cottage cheese, other manufactured dairy and food products and some work in industrial field. Prefer man with experience in dairy equipment or food equipment industry. Adequate starting salary and opportunity for advancements. Pemanent position. Midwest location convenient to hunting and fishing. Company owned house available immediately. Liberal hospitalization and employee benefits. Write. P-4664, Food Engineering.

EMPLOYMENT SERVICE

Salaried Personnel. $5,000-$30,000. This confidential service established 1927 is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F., P. O. Box 674, Manchester, Vermont.

POSITIONS WANTED

Quality control and production supervisor, age 37, B.S. in chemistry 11 yrs. diversified experience in Mfg. of foods including packaging process development trouble shooting control procedures. A loyal conscientious man looking for a progressive company with challenging problems and opportunity for advancement. PW-4765, Food Engineering.

Food Technologist available for summer packing season, June 1-September 1. Diversified experience in canning and freezing. PW-4776, Food Engineering.

WE NEED
FOOD TECHNOLOGISTS and FOOD CANNNING CANDIDATES
—junior to top-level
Call, write or wire:
Gladys Hunting (Consultant)
Drake Personnel, Inc.
220 S. State St., Chicago 4, Ill.
HArrison 7-8600

ASS'T. PLANT SUPERINTENDENT

Young man experienced in production to understudy plant superintendent.

JOHN R. THOMPSON CO.
Frozen Food Div.
350 N. Clark St. - SUperior 7-4767
Chicago 10, Ill.

EMPLOYMENT PROBLEM?

When you are in need of specialized men for specialized jobs, contact them through an employment ad in this publication.

OPENING FOR

RESEARCH and ANALYTICAL CHEMIST

For large eastern Frozen Food Manufacturer. We are building a new additional research and analytical laboratory, also expanding present quality control laboratory. A competent individual is needed to fill department head position.

Necessary requirements are:

1. **B. S.—M. S.—or D.Sc. in Chemistry**
2. **Food background and experience in canned foods, juices, or preferably, frozen foods.**
3. **Must be willing to relocate.**
4. **Detailed resumes must be presented and will be held in strict confidence.**

State necessary salary requirements.

P-4662, Food Engineering,
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

FOOD TECHNOLOGIST—CHEMIST

Experienced in research and development preferably in coffee or flavor industry. Assignment will be to guide ambitious program for young, aggressive company—an industry-leading firm, located in Eastern Pennsylvania. Working conditions excellent—new air-conditioned plant in pleasant suburban area. The opportunity is challenging—the future sound. Send details on education, experience and salary requirements to

P-4485, Food Engineering,
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

PROJECT ENGINEER

B.S.—Ch.E. or M.E. Five to ten years experience in process industries, preferably food or chemical, for plant engineering division. Design and installation of new facilities. Salary commensurate with experience. Submit detailed resume.

CAMPBELL SOUP COMPANY
100 Market St., Camden 1, New Jersey

***WANTED* SPECIALIZED CHEMIST**

AN IMPORTANT OVERSEA CORPORATION OWNING AN UP-TO-DATE PLANT FOR THE PRODUCTION OF **MONOSODIUM GLUTAMATE** WANTS A **SPECIALIZED CHEMIST**, WHO IS CAPABLE TO ORGANIZE THE ENTIRE PROCESSING CYCLE FROM STEFFENS' VINASSES OR FROM MOLASSES DISTILLATION SLOPS. Please write fully to

P-4721, Food Engineering
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

BUSINESS OPPORTUNITIES — EQUIPMENT - USED or RESALE

UNDISPLAYED RATE:

$1.50 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.

PROPOSALS, $1.50 a line an insertion.

BOX NUMBERS count as one line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED RATE:

The advertising rate is $13.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

Send NEW Ads or Inquiries to Classified Adv. Div. of Food Engineering, P. O. Box 12, N. Y. 36, N. Y., for May issue closing April 26th

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A BRILL BUY
. . . IS THE BEST BUY

SPECIALS

Nooter 1000 gal. nickel clad, jacketed, agitated Reactor.
Pfaudler 500 and 300 gal. glass lined, jacketed, agitated Reactors.
1—Pfaudler 1000 gal. glass lined Storage Tank.
2—Nooter 750 gal. S.S. agitated Tanks with steam coils.
5—Bird 32"x50", 316 S.S. Solid Bowl, Continuous Centrifuges.
2—Bird 24"x38", 18"x28", 304 S.S. Solid Bowl Continuous Centrifuges.
1—Niagara #230-32 Pressure Filter, 304 S.S., 230 sq. ft.
5—Sparkler 33-S-28 Pressure Filters, 304 S.S., 150 sq. ft.
1—Sperry 30" Heresite coated F&F Filter Press.
1—Baker Perkins 100 gal. Stainless Steel, Sigma Blades, Jacketed Mixer.
2—Buffovak 42"x120", 42"x90" Double Drum Dryers.
1—Link Belt 5'2" x 20' Steel Roto-Louvre Dryer.
1—Hersey 18"x12' Hot Air Rotary Dryer, 304 S.S.
4—Sweetland Filters #3, #5, #7, #12.
1—#2TH Mikro Pulverizer.

BRILL
EQUIPMENT COMPANY

2401 Third Ave., New York 51, N. Y.
OR
4101 San Jacinto, Houston 4, Texas

FOR SALE

2 Hasselberg air compressors, one has 40 HP, AC motor, cap. 200 CFM; 1—20 HP motor; can be purchased separately at half of new price, complete and ready to run.

FS-4556, Food Engineering,
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

FOR SALE

18" Copper Coating Pans with stem coils
300 gal. Copper Still with condenser and tank
100 qt. 3 speed Read Master Mixer
80 qt. M-80-4 speed Hobart Mixer
100 gal. Copper Steam Jacketed Mixing Kettle
York Freon Compressor with 1½ HP 3 phase motor
Burns Split Nut Peanut Blanchar

SAVAGE BROS. CO.
2636 Gladys Ave. Chicago 12, Ill.

CAPEM SEALING MACHINES

Two, four or six head rotary type Capem Sealing Machines. Specify what cap sizes each machine will handle, model and serial numbers, condition and price.

W-4567, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

MORE FOR YOUR MONEY

- Std. Knapp Model F Caser, set for 6 oz. Cans
- Std. Knapp Model F Caser, set for 303 Cans
- Urschel Model B Dicer, with 2 HP motor
- Knapp 8 oz. #10 Labeler, with motor
- Canco 08 Can Seamer, set for #10 can
- Hamilton 40 gal. S.S. Kettle, 90 lbs WP
- Canco 400 Can Seamer set for 401 dia. can
- Groen 60 gal. model RA agit. Kettle New. (2)
- Groen 80 gal. model RA agit. Kettle New (2)
- Langenskamp 250 gal. S.S. Jkt. Kettle 90 lbs.
- M&S 6 Piston #10 Filler, bronze with SS bowl
- Pfaudler C 9 Filter, S.S. set for #10 cans
- Pfaudler C-18 Rotary S.S. Filter, 211 dia. can
- FMC 24 valve S.S. Filler for 211 cans
- CRCO model 500 Hand Pack Filler
- Horix 18 spout Rotary S.S. Filler
- FMC model 35, Super juice Extractor, 5 HP
- World Duplex Straight Line Labeler, model 120
- World Uni-Turret Labeler, complete
- Zenith Pulp Press, with 20 HP motor
- Globe Roto Cut, model 621, type 420, 40 HP
- Bird 18" x 28" continuous Centrifuge, 316 S.S.
- AT&M 42" S.S. Centrifuge Perforated Basket
- York 18 plate SS Exchanger Model 16576 MKD
- Pfaudler 500 gal. glass Reactor, model ELL
- Roger 6' dia. S.S. Vacuum Pan, coil type
- Standard Knapp Model 2t Case Printer, New

GOOD USED EQUIPMENT

MACHINERY AND EQUIPMENT COMPANY GO WEST

514 Bryant Street • San Francisco 7, Calif.

FLOWMASTER REACTOR

Model 100
Serial 2847
HARRIS MACHINERY COMPANY
501 30th Avenue S.E., Mpls. 14, Minn.
FRanklin 1-1829

Hamilton S.S. tilting kettle

Double motion lift-out agitator, 15 lb. PSI, 650 deg. F. temp. Ser. #12982, less motor, cost new $1861.00, asking $1000.00. Photograph upon request.

ACE PROCESSING CO.
6825 South Kenwood, Chicago
Museum 4-3380

STAINLESS HEAT EXCHANGER

Enzinger 20' long shell and tube stainless cooler, having 10 2-1/16" O.D. stainless tubes; practically brand new, immediate delivery.

FS-4560, Food Engineering,
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

SPECIAL SERVICE

Rebuild those leaking valves!! Sanitary valves rebuilt for a fraction of the cost of a new valve. Prices submitted on request. Stuart W. Johnson & Co., 611 Main Street, Lake Geneva, Wis.

FOR RATES OR INFORMATION

About Classified Advertising

Contact
The McGraw-Hill Office
Nearest You

ATLANTA, 3
1301 Rhodes-Haverty Bldg.
JAckson 3-6951
R. POWELL

BOSTON, 16
350 Park Square
HUbbard 2-7160
H. J. SWEGER

CHICAGO, 11
530 No. Michigan Ave.
MOhawk 4-5800
W. HIGGENS J. BRENNAN

CINCINNATI, 37
1825 Yorktown Rd.
Swifton Village, Apt. 2
REdwood 1-3258
G. MILLER

CLEVELAND, 15
1510 Hanna Bldg.
SUperior 1-7000
W. SULLIVAN

DALLAS, 2
Adolphus Tower Bldg.
Main & Akard Sts.
Riverside 7-5117
E. SCHIMER

DETROIT, 26
856 Penobscot Bldg.
WOodward 2-1793
W. STONE

LOS ANGELES, 17
1125 W. 6th St.
MAdison 6-9351
C. FRUHLING D. McMILLAN

NEW YORK, 36
330 West 42 St.
LOngacre 4-3000
S. HENRY
D. COSTER
R. LAWLESS

PHILADELPHIA, 3
17th & Sansom St.
RIttenhouse 6-0670
E. MINGLE H. BOZARTH

ST. LOUIS, 8
3615 Olive St.
JEfferson 5-4867
W. HIGGENS

SAN FRANCISCO, 4
68 Post St.
DOuglas 2-4600
W. WOOLSTON

SPECIAL OFFERINGS

Modern Packaging Equipment

KARL KIEFER 24 Head Fully Automatic, Stainless Steel Vacuum Fillers.

CAPEM 4 and 3 Head Fully Automatic Cappers.

The above machines are in practically new condition.

PNEUMATIC SCALE COMPANY Cartoning Line, Consisting of: Automatic Feeder, Bottom Sealer, Filler, Top Sealer & Compression Unit.

PNEUMATIC SCALE COMPANY Tightwraps, High Speed.

PNEUMATIC SCALE COMPANY, WORLD and PONY fully automatic and semi-automatic Labelers, 60-120 per minute.

STOKES & SMITH Model D Neverstop.

STOKES & SMITH Model H.G. 84, G, and GD Auger Fillers.

STOKESWRAP Model A with electric eye, counter, stainless steel auger filler.

PACKAGE MACHINERY CO Model FA & FA2 Wrappers.

Partial List— send for complete list of equipment in stock.

JUST RECEIVED

Pneumatic Scale Company
120 Per Minute Bottling Line
consisting of Bottle Cleaner, Stainless Steel Filler, 4 Head Rotary Capper and Duplex Labeler. Above unit Five years old.

ALLIED EQUIPMENT CO.
940-946 Nepperhan Ave., Yonkers 3, N. Y.
Phone: Yonkers 5-0442

BARGAINS FOR SALE

The Ruderman Machinery Exchange of Gouverneur, N. Y., one of the largest diversified Machinery & Equipment Dealers in America, can furnish you with practically all your needs in Modern Ice Cream, Milk Plant and Electrical Equipment at but a fraction of the original cost.

WRITE—WIRE—PHONE FOR YOUR NEEDS

RUDERMAN MACHINERY EXCHANGE
Gouverneur, New York Telephone: 333-334

APRIL SPECIALS

Retorts Horiz. & Vert. All makes & sizes
Pfaudler 100 gal. SS agitated kettle
Piston fillers 1-2-4-6 & 8 spouts.
FMC Hand Packed SS Filler # MH1509
316 SS Single Drum 3' x 5' Dryer, 5 H. P.
MRM 12 spt. SS Straight Line Vac. Filler
Biner Ellison Model 16-Q Filamatic
World Twin Turret Labeler, 120 per minute
Capem SIF Automatic Capper, up to 85mm
3 Pony Labelers, 86MXX, 86ML & 86MX
3 Ro-Ball Sifters 20" x 48" with drive & motor
Wrap Around Labelers. All makes & Sizes

NEW—STEEL S/S MIXERS, KETTLES & TANKS. Fabricated to Your Specifications. Engineering Advice Available.

We Buy Complete Plants or Single Units What Have You For Sale?

YOU CAN BANK ON

EQUIPMENT CLEARING HOUSE, INC.
111 33rd Street Brooklyn, N. Y.
SOuth 8-4451—4452—8782

FMC

Choice Equipment for the Food Industries . . in Stock for Immediate Shipment

NEW FALCON Ribbon Blenders or Mixers in Mild or Stainless Steel; all sizes
NEW Stainless Steel Steam Jacketed Kettles and Tanks; all sizes
Special Lot of Stainless Clad Kettles; Steam Jacketed; 80 gal. capacity
Copper Kettles up to 250 Gal.; Glass Lined to 300 Gal.; Aluminum to 80 Gal.
VACUUM PANS: Pfaudler Glass Lined, 500 and 1000 Gal.; Aluminum or Copper 250 Gal.
Sterilizers: 48"x42"x96"; 36"x42"x84"; Ft. Wayne 61"x126"; others
Double Drum Dryers: 32"x72"; 42"x100"; Twin Dryers 42"x120"
Buffalo Chrome Plated Flaker: 12"x18" complete with accessories
Food Machinery Corp. Retorts: Standard 42"x72" Vertical
Devine No. 23 Double Door Vacuum Shelf Dryer: 57"x78" shelves; complete
Stokes No. 138B Vacuum Shelf Dryer: Shelves are 24"x24"; complete
Anderson Oil Expeller Model "Red Lion" with 15 Hp. motor and accessories
Anderson Oil Expeller Type "RB" with 25 HP motor and accessories
American Utensil (CRCO) Model "B" Juice Extractor with 5 HP Motor
Manton Gaulin Stainless Steel Homogenizer Type 125 CGC
A. T. Case Stainless Steel S 50 Homogenizer with 15 HP Motor
Charlotte Model 50 Colloid Mill in Monel
DICERS by Sterling and Anderson; Rotary Cutters by Abbe, Ball & Jewell, Munson
Sterling and Blakeslee Potato Peelers: Various sizes; Coffee & Meat Grinders
Robinson and Bauer Double Runner Attrition Mills: 24" and 18" with 2 Motors
Hammer Mills, Grinders, Crushers by Williams, Gruendler, Jay Bee, Mikro etc.
Sprout Waldron 2 Pair High Roller Mill: 9"x18"; Robinson Unique 4 Roll 7"x24"
SIFTERS. Witte, S.S. 21"x101"; Rotex 30"x60"; Patterson Gyro 3 Deck 20"x84"
Robinson Unique S.S. 20"x70"; Ajax Vibratory in S.S. 18"x48"
Robinson Gyro Double Deck 20"x90"; Selectro 18"x48" & 24"x84"
J. H. Day Egg Clipper Mixers: 20"x22"x28" and 32"x32"x25"
Savage Marshmallow Beater: 200 lb. Capacity; arranged for M.D.
FILLERS: Stokes & Smith Powder Fillers, Semi and Automatic Models
Triangle Electri-Pak 4 Station Conveyor Type Filler
Gump Bar-Num Vibrox Barrel Packers
Berlin Chapman Syruper Type Liquid Filler up to 6o 3 Cans
Berlin Chapman Stainless Steel 7 Spout Filler up to No. 10's
Horix Stainless Steel 14 Stem Gravity-Vacuum Fillers up to qts.
Karl Kiefer 2 Stream Vari Visco Filler for Liquids and Semi-Liquids
Karl Kiefer Rotary Vacuum Fillers with 12, 16 and 18 Stations
LABELERS: Can Labelers by Standard Knapp, Burt, Kyler, Nu-Method and others
Bottle Labelers by New Jersey, World, Ermold, Pneumatic Scale, others
Piston Fillers from 1 to 11 Pistons, by Elgin Filler M Co., Bridge, etc.
M. & S. Stainless Steel 10 Pocket Hi Speed Fillers for small cans
CAPPERS: Pneumatic Scale 4 Head Automatic Capper; Capem 4 Head Model B2F
Johnson Automatic Wrapper for Frozen Food Packages; adjustable within limits
Standard Knapp Automatic Gluer & Sealer No. 429-600 Series complete
SPECIAL AGITATORS at less than Half Price: Top Entering 5 HP S.S. 240 RPM

The above list represents only the more important units; if you do not see listed the item you need, do not hesitate to send us your inquiry.

SEND US YOUR LIST OF SURPLUS EQUIPMENT

FIRST MACHINERY CORP.

209-289 TENTH STREET, BROOKLYN 15, N. Y.
PARKING ON THE PREMISES
PHONE: STerling 8-4672

FRED FIRSTENBERG *President*

Cable "EFFEMCY"

FILTERS FOR SALE

Niagara diatomaceous earth filters, cap. 300-400 gpm. ea., with 15 Niagara leaves and total area of 330 sq. ft., in each of two filters; capacity may be increased by ⅓, with quick-opening patented cover, pumps; price less than half of new, inspection invited; also Niagara Model 45, new, never used; complete with fittings, pumps, motor, immediate delivery. Bargain price.

FS-4562, Food Engineering,
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

FOR SALE

ATMOSPHERIC DOUBLE DRUM DRYERS

One—42" dia. x 120" lg. American complete with drive, conveyors, elevator, hood, etc. Operated at 80 PSI. Used on milk. Located in Midwest. Excellent, Reasonable.
Two—42" x 100" Buffovac, same specs.
Two—42" x 90" Buffovac in West, same specs.
One—24" x 36" American, same specs.
S/S TANKS: TWO-700 GAL. vertical, round.
S/S TANKS: TWO-1750 GAL. horizontal, rectangular.
S/S TANK: 3,250 gal. horizontal, insulated.
HEAT EXCHANGERS: Fourt shell and tube type. S/S sanitary, 64 to 150 sq. ft. Used on milk.
HEAT EXCHANGERS: Two plate type, S/S sanitary Creamery Package and Cherry Burrell makes. 31 and 75 plates each. Used on milk.
S/S RIBBON BLENDER, 110 gal., Robinson with ASME steam jacket.

BEST EQUIPMENT COMPANY
1737 W. Howard Street, Chicago 26, Illinois
AMbassador 2-1452

FOR SALE

Filler & Sealer—Brand new in original crate models SA, and SHA Triangle. Also Eleven Liquid filling machine, one right, and one left portable glue rolls, new, and a reconditioned 200 lb. Day mixer and sifter. Must Sell.

Write L. STEINHORN
61 Manchester Place Buffalo, N. Y.

FOR SALE

2 Vilter 7½ x 7½ compressors; each cap. 30-Ton, with 40 HP, 220 Volt, G.E. motors; still erected in west coast plant with other refrigeration equipment; immediate delivery, bargain price.

FS-4558, Food Engineering,
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

FOR SALE

2—Pneu. Scale 6 head capper, 53 mm.
3—Bird T316 St. St. Continuous Centrifugals 32" x 50", 40" x 60".
2—Filler Machine Co., 4 cyl. St. St. piston fillers.
5—Sparkler #33-S-28 Filters, Steel body, St. St. plates.
1—Niagara type 316 S. S. Pressure Filter, model 510-28, 500 sq. ft.
10—Shriver & Sperry Filter Presses.
4—Double Drum Dryers: 42" x 100', 32" x 52".
7—Vac. Shelf Dryers: 55 to 475 sq. ft.
2—St. St. Spray Dryers: Lab: 19' Dia.
2—Rotary Steam Tube Dryers, 4' x 30'; 6' x 30'.
3—Vacuum Stills: 50, 100, 300 gal. Monel, St. St.
1—Buflovak #6.5 St. St. Double Effect Evaporator, 508 sq. ft.
1—Stokes Type 316 St. St. Double Effect Evaporator, 250 GPH.
1—Conkey Triple Effect Evap. Silicon Bronze, 1900 sq. ft.—UNUSED.
3—Fitzpatrick Comminutors, St. St. models D, F.
5—Pfaudler Glass lined jacketed Reactors, 30, 50 & 100 gal.
2—125 gal. St. St. Jacketed Kettles, Scraper Agit.
1—55 cu. ft. Spiral Ribbon Mixer
4—Mixers St. St. Double Arm. 5, 50, 75 gal.
1—3590 gal. Stainless Steel single axle Truck Tank.
30—Stainless Steel Tanks—30 gal. to 10,000 gal. sizes. NEW & USED.
3—3000 gal. St. St. Tanks, 6' dia.; with coils.
75—Welded Steel Tanks—Brewery lining.

BOILING CANNING PROCESSING — PERRY MACHINERY SUPPLIES

PERRY EQUIPMENT CORP.

1411 N. 6th St., Phila. 22, Pa. Phone: STevenson 4-3505

FOR SALE

40 H.P. Cleaver Brooks Boiler, Oil Fired.
3200 gal. S.S. Truck Tank & Trailer.
100 to 400 gal. S.S. Mix. Tanks, water jkt.
200 gal. S.S. Tank, 40"x38", side agit.
250 gal. Vert. S.S. Tank, insul., agit.
330 gal. S.S. Tank, 45"x48", side agit.
500 gal. S.S. Tank 50"x64", insul.
500 gal. Pfaudler G.L. Tank, jkt., T.C. Coil.
3 ft. & 5 ft. Mojonnier S.S Vacuum Pans
125 to 1500 gal. Homogenizers or Viscolizers.
Hope Two Plunger Filler, s.s.
50 gal. S.S. Premixer (Tank), side agit.
Little Giant Ice Breaker, 1 H.P.
Baltimore Aircoil Water Cooling Tower, 90 G.P.M.
42"x120" Double Drum Dryer.
1" S.S. Tubing & Fttg., Sanitary Type.
Milk Pasteurizers, Coolers, Fillers, Washers.

Send us your inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street New York 17, N. Y.
Murray Hill 2-4616

BOILERS

HI-PRESSURE

Complete stock from 10-2,000 h.p.
Nation's largest inventory, New & Used

WABASH POWER EQUIPMENT
31 E. CONGRESS, CHICAGO 5, HA 7-4855

DEHYDRATING PLANT

1—Davenport 6 x 30' Steam Tube Dryer.
1—Erie City 150 H.P. 125 lbs. Economic Boiler.
1—Williams Hammer Mill with 30 H.P. motor.
—23' & 40' Bucket Elevators, 6" and 9" Screw.
—Conveyors with housing; Steel Tanks & Hoppers, etc.

Send for Bulletin 4025

THE MACHINERY & EQUIPMENT CORP.
293 Frelinghuysen Ave., Newark 12, N. J.
TAlbot 4-2050

STAINLESS CENTRIFUGAL

1 used "American Tool" stainless suspended centrifugal, 40 x 24, used few weeks only, for concentration of fruit juices; like new, now with 15/7¼ HP, 1200/600 RPM, 60 cycle, 220 Volt, 3 phase, AC motors and starters, (brand new explosion-proof motors substituted if required, from stock at extra cost) available immediate delivery, can be inspected as last used, still erected, subject to prior sale.

FS-4534, Food Engineering,
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

LOEB OFFERINGS

Cappers, Capem, Titecap, Swanson, U. S. automatic and semi-automatic.
Centrifugals: Fletcher 12" capper, 20" lith-coated, Tolhurst 26" capper, 26" rubber.
Clarifiers: De Laval model 84-51.
Cutter, Bone: Wausau, 5 hp.
Deodorizer: Rogers 40" stain. steel.
Dryer: Devine 2 x 4' vac. drum, st. steel.
Dryer: Bowen lab. spray, st. steel.
Dryer: Direct Heat 4' x 20'.
Dryer: Stokes rotary vacuum 2½ x 8'.
Dryer: Atmospheric double drum to 120".
Dryer: Nordyke-Marmon 120 bu.
Extractor: Troy 26" monel basket.
Fillers, liquid: vacuum, siphon, gravity.
Fillers, piston: Stokes, Colton, Elgin, Filler Machine Co. for jars, tubes.
Fillers: M & S for cans 6 and 10 pocket, st. st.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson, Gump.
Filter Presses: Sperry, Shriver 6"-36", recessed and plate and frames types.
Filters: Int. pressure—Alsop, Sparkler, Lomax, Industrial, Sweetland.
Filter, vacuum: Oliver 2½ x 1'.
Gluer: Packomatic with 40' Compressor.
Homogenizer: 2-1200 GPH. Union, 300 GPH. Union, 125 and 400 GPH. Gaulin.
Kettle: Dopp 150 gal., jkt. agitated.
Kettles, Stainless steel: 5' to 300 gal., with and without agitators.
Aluminum 40 to 100 gal.
Labelers: Burt, Knapp, New Jersey, World, Ermold—auto and semi-auto.
Muller: Simpson 39½" type 316 s. s. bowl.
Mixer: Glen Power Plus 340 qt., 5 hp.
Mills, hammer: Mikro 2TH, Gump #1, Prater, Raymond, Jay Bee, Jeffrey, 30 x 24", Williams #2 and 8X, Fitz Mill D6, 5 hp.
Colloid: Charlotte st. steel 1 hp., iron 25 hp.
Mixers: Dough type single and double arm. Day high speed, 40 hp.
Powder: 50 to 2000 lb. capacity.
Gemco 5' x 14" st. steel.
Portable Electric: ¼ to 5 hp.
Pumps: Centrifugal, rotary, gear, vacuum, all types and sizes.
Screens: Rotex 20 x 48", 42 x 84', 18 x 50", Selectro 4 x 10', Abbe Blutergess #1.
Separator: De Laval Nozzle-Matic AC VO.
Still, water: Barnstead 75 gal.
Tablet Presses: Single punch and rotary.
Tanks: Stain. steel 25 gal. to 1200 gal.

TANKS: 9-150 gal. st. steel open top, bottom jacketed, ⅓ hp. port. mixers, covers.

Send us your inquiries and list of idle equipment

LOEB EQUIPMENT SUPPLY CO.

820 West Superior St. Chicago 22, Ill.
Telephone Seeley 8-1431 Our 32nd Year

These "Searchlight" advertisements

are live opportunities in the Food field.

Each announcement represents a current Want or Offering of an organization or individual in the field. Some have money-saving possibilities, others are opportunities for more business; many offer equipment—used or surplus new.

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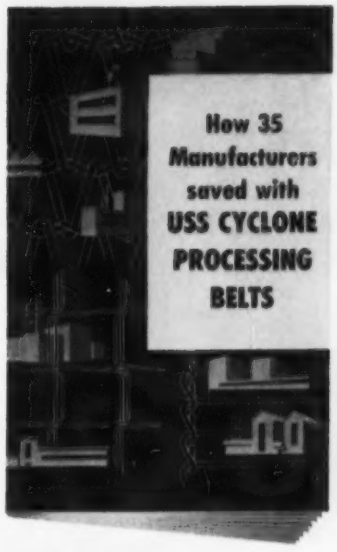

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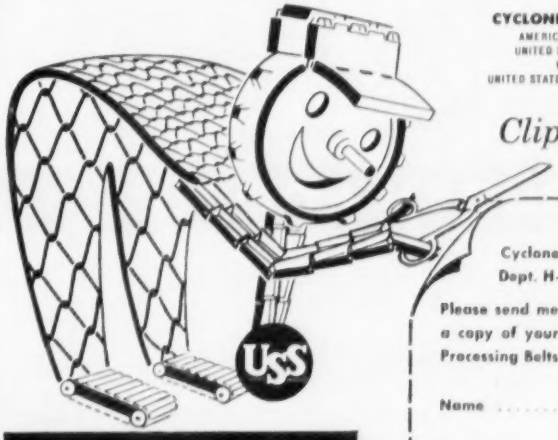

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8 All items shown
- 8a Style SA kettle
- 8b Style CW kettle
- 8c Style PC kettle
- 8d Style VT kettle
- 8e Style SB kettle
- 8f Style SA mix cooker
- 8g Style CW mix cooker
- 8h Style HV mix cooker
- 8i Circulator
- 8j Style A kettle

20a Victor supreme
20b Victor 475

32-3 All items shown
- 32-3a SS tubing brochure
- 32-3b Enduro
- 32-3c Electrunite

55a S-815 flat-top chain
55b Folder 2344

57 All items shown
- 57a Kettles
- 57b Scraper-agitator
- 57c Cooling pan
- 57d Vacuum pan
- 57e Pulp tanks
- 57f Pressure kettle
- 57g Storage tank

90 All items shown
- 90a Buls. 559 & 49-DC
- 90b Bul. 576
- 90c Bul. 560
- 90d Bul. 471

103 All items shown
- 103a Bul. B-102
- 103b Bul. B-103
- 103c Bul. B-108
- 103d Bul. B-104
- 103e Bul. B-112
- 103f Bul. B-109
- 103g Bul. B-111
- 103h Bul. B-107

145a Palatone

145b Cyclotene

155a Extracts

155b Whole ground plants

169a Hersey dryer bul.

169b Recorder & indicator cat.

174a Conveyor belting

174b Sealtite

175a Trap selector

175b Steam trap bul.

177a Refrigeration

177b Dispenser-homogenizer cat.

178 All items shown
- 178a Model EG-1
- 178b Model HG-84
- 178c Stokeswrap
- 178d Stretchrap

182-3 All items shown
- 182-3a Scroll shear no. 1100
- 182-3b Bodymaker no. 405
- 182-3c Flanger no. 1315
- 182-3d Trimmer & slitter no. 5225
- 182-3e Double curler no. 20.
- 182-3f Strip feed press no. 1831

201a Pulverizers

201b Conveyor belting

209a Protective liners

209b Bul. 89

210 All items shown
- 210a Fig. 2309
- 210b Fig. 2491
- 210c Fig. 1886
- 210d Fig. 2107

221a Self-powered temp. cont.

221b Elec. indicating temp. cont.

224a Lubriplate data book

224b Steel

224c Bul. N-2

231a Prest-O-Matic doors

231b Process equip.

231c Packaging machine

232a Nozzle cat.

232b Bul. 119

232c Trucks

234a 42nd washer

234b Han-D filler

235a Camco-roll-thru-unit

235b Colloids out of sea

235c Bul. 344

236a Separating machine

236b All items shown
- 236c Jr. cat. 54G
- 236d Bul. 48JS
- 236e Bul. 540J
- 236f Bklt. 53SR
- 236g Bul. 53SC
- 236h Bul. 54-TL
- 236i Bul. D

236j Brushes

238a GSC pumps

238b NDGA anti-oxidant

243a Tickometer bklt.

243b Package imprinter bklt.

245a Bul. 139

245b Kold wall vestibule

246a Hope cat.

246b E-Z adjust pulper

247a Rust-Go

247b Torula yeast

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